George Frederick Holden
his Book July 23rd 1803

G. H.

G. Holden

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A

TREATISE

OF THE

DISEASES

OF THE

BONES;

Containing an Exact and Compleat

ACCOUNT

OF THE

NATURE, SIGNS, CAUSES and CURES thereof, in all their various KINDS.

WITH

Many new and curious OBSERVATIONS concerning the VENEREAL and other DISTEMPERS; with the newest and best Method of Practice, in each respective CASE.

AS ALSO

The FIGURES representing the several Dressings, Machines and Instruments here described.

Translated from the *French* of JOHN-LEWIS PETIT, of the Royal Academy of Sciences, sworn Surgeon of *Paris*, and late Master of his Company.

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THE

PREFACE.

THE first time that my *Treatise of the Diseases of the Bones* saw the Light, Self-Love induced me to think that I made the World a very valuable Present. 'Tis true, I had already some Experience in

Surgery; and the Authors I had read, had not written any Thing better.

The Foreigners, and the Students of our Nation, who were preſent at my private Lectures, were ſo well ſatisfied with them, that they deſired I would give them my Dictates; but as I had not tranſcrib'd any Thing upon that Head, I propoſed their writing down, themſelves, what they remembered of my Leſſons, promiſing to make what Corrections and Additions were neceſſary therein. They did ſo; I kept my Word; and from the Lectures I then read, a rough Draught was formed, whereon I have worked with tolerable Succeſs.

My Manuſcript was ſoon ſpread all over *Paris*, and the Fear of ſeeing it publiſhed, with all its Errors,

rors, obliged me to give it to the Sieur *d' Houry*, a Bookseller, to print.

CONTRARY to my Expectation, my Book was translated into several Languages. The first Reception proving so favourable, I was tempted to set about a second Edition, which had been more immediately finished, had I not been hindered by certain Parts of my Profession, which prevented my applying my self entirely to the Practice of Chirurgical Observations, and the Cure of Venereal Distempers, to which the Publick were desirous I should confine my self.

WHEN I have any leisure Hours, I will imploy them in writing those Observations I have already made, and which I am still daily making, in the Practice of Sur-

gery; and I will publiſh them from Time to Time, after this Treatiſe. This Promiſe ſhall be effectually performed, and that with the greater Advantage to Students, by Reaſon moſt Part of thoſe who have treated of Surgery, are Perſons who have never practiſed it, or Surgeons to whom the Publick allow'd ſufficient Time to write; but not Buſineſs enough to enable them to relate Matters of Fact verified by their own Experience. 'Tis the Misfortune of paſt Ages: They who did not practice Surgery, have treated of it; and they who have practiced it moſt ſucceſsfully, have let their Obſervations die with them.

Wherefore 'tis neceſſary for ſuch as have practiſed, and continue therein, not to be ſparing of their Knowledge; but that they either communicate it during their Lives,

Lives, or at leaſt leave it to Perſons who may publiſh it after their Deceaſe.

NOT to do ſo, is to commit a Crime againſt Humanity; 'tis violating the Laws of Society; and (to uſe that Expreſſion) dying inſolvent. I hope I ſhall not deſerve that Reproach: Theſe Laws are to me ſo ſacred, and I carry the Scruple ſo far, that I reſerve nothing particular for my own Children, although I deſign them for Surgery: They ſhall be equal Sharers with all the Students; and ſhall have no Advantage over them, but that of being under my Eye, and trained up by me. Above all, I will inſpire them with the Love I bear my Country; and if, at my Death, I am any Thing indebted to her, I hope they will be able to diſcharge for me what

I have not had Time to repay her.

In order to ſatisfy the Obligation I contracted, I begin with the *Treatiſe of the Diſeaſes of the Bones*: This Work coſt me more Pains than I imagined. To ſave Time, I was willing the firſt Edition ſhould be my Guide in finiſhing the ſecond; but I found, too late, that I ſhould have had leſs Trouble if I had wrought upon a new Plan. The Work will not be leſs valuable; I dare even believe, that it will be more uſeful to young Surgeons, becauſe I have followed the Order of the School; it may indeed tire the Maſters of the Art; but the one will be obliged to me, and the others will excuſe it.

I hope it will be forgiven me if the Stile is not equal throughout the Work. It might have been ſo

if I had perceived ſooner that it is more difficult to comment upon a Book, than to write a new one. In ſome places they will find the ſame plain Stile which was proper for me to uſe twenty Years ago, when I wrote the firſt Edition: In others they will ſee that I have riſen above my ſelf, by ſome Pieces that I had Leiſure to finiſh; but what will make an amends for this Inequality, is the Exactneſs, and Truth in the Relation of Matters of Fact, and the ingenious Confeſſion that is made of the Events, whether ſucceſsful or otherwiſe.

AMONGST thoſe that are cited, the *Rupture of the Tendon of Achilles* is the only one that has, as yet, been diſputed me; but, I hope, that in reading what is here ſaid upon that Head, the Truth will be known by the Proofs I have given,

given, and yet better by the Objections that have been made to it. 'Twere to have been wiſhed, that before my printing the Chapter of the Rupture of the Tendons, I had read what *Paræus* ſays concerning that of the Tendon of *Achilles*; I ſhould have quoted him, and perhaps, my Adverſaries would have been ſatisfied with that Authority; it is at leaſt, as much to be regarded as that of *Taliocotius*, an Author deſcending in a right Line from the old Reſtorers of the Noſe.

Let not what I have ſaid of *Paræus* be looked upon as an uſeleſs Epiſode; I was obliged to juſtify my ſelf, or rather to prevent thoſe who might have reproached me with not having quoted ſo famous an Author. The Truth is, that not having read that Part of his Book till mine

was

was entirely printed off, I could not do him Juſtice but in this Preface.

THE firſt Part of this Work treats of the Diſeaſes that affect the Joints: The Luxations in general, and each in particular, are amply explained therein; on their Account I ſpeak of the *Cliquetis* and Sprains; the laſt Chapter is a compleat Treatiſe of the *Anchyloſis*; each Article contains a great Number of Remarks and Obſervations, which will be of Advantage to young Students, for whoſe Benefit I write.

THEY will alſo be inſtructed in ſeveral Places, how to prevent being impoſed on by certain Boneſetters: I have taken Care to diſcover the Artifices they uſe among the People, through whoſe Igno-

Ignorance and Simplicity they have acquired the falſe Reputation they enjoy.

The ſecond Part contains all the Diſeaſes that affect the Body of the Bone. Both the Fractures in general, and the ſimple and complicated ones, of each Bone in particular, are amply treated of therein: And the Prognoſtick, manual Operation, and Cure of all are authoriſed by ſeveral Obſervations. In each Part there will be found divers Diſtempers that have not been taken Notice of by any Author, ancient or modern. Both in the one and the other I have placed Figures, with alphabetical Letters, to deſcribe the Dreſſings and Machines that are proper for the Cure of fractured or diſlocated Bones. The Practice of the ignorant Bone-ſetters

ters is there set down for the Instruction of young Pupils, and to disabuse the People.

The last Chapter but one is a very ample Treatise of the *Exostosis* and *Caries*: I may venture to say, that this Disease was never so exactly examined into: There are numberless Observations inserted, to give a clear Insight into the Matter; and the Aphorisms, that conclude it, make me flatter my self, that it will be acceptable to all, who not being implicit Admirers of Antiquity, are willing to give their Votes in Favour of such new Discoveries as are founded upon Reason and Experience.

The last Chapter is a Treatise of the *Rickets*, wherein not only the Causes of the Distemper and its Symptoms are searched into,

to, but the Reaſon of the Softneſs and Crookedneſs of the Bones are explained; the Sentiments of the Authors moſt in vogue quoted, the Objections anſwered, and the whole concludes with the Cure of this Diſtemper.

If I have taken Pains to make my Work uſeful, the Bookſeller, on his Side, has done his utmoſt to render the Edition perfect: The Approbation of the Publick will ſatisfy the one, and a quick Sale will be a Recompence for the other.

EXTRACT

EXTRACT of the REGISTERS of the Royal Academy of Sciences, for the Years 1720, 1721, 1722.

MESSIEURS *Litie* and *Winslow*, who were appointed to examine Mr. *Petit* the Surgeon's *Treatise of the Diseases of the Bones*, having made their Report to the Company; and having said, that this Work was answerable to those signal Proofs of Skill in Anatomy, Industry in Mechanicks, Dexterity in Surgery, Fertility in Invention, Solidity in Practice, and Clear-

Clearneſs in Demonſtration, which the Author has, for theſe many Years, continued to give the Publick, they have judged it worthy of being printed. As a Teſtimony whereof I have ſigned this preſent Certificate.

Paris the 1ſt of *March* 1723.

Fontenelle.

Perpet. Secret. to the Royal Academy of Sciences.

A TREATISE OF THE *Diſeaſes of the Bones.*



THE Diſeaſes of the Bones are of two Sorts; the one affects the Bones themſelves, and the other their Joints only. The Body of the Bone is ſubject to be hurt by a *Fracture*, *Exoſtoſis*, *Caries*, *Softneſs*, and *Crookedneſs*. The Joints are afflicted with the *Gout*, the *Anchiloſis*, *Rattling*, *Sprains*, and *Luxations*. I ſhall begin with the two laſt of theſe Diſtempers.

BOOK I.

Of LUXATIONS and SPRAINS.

CHAP. I.

Of LUXATIONS in General.

Definition.

A *Luxation* is a Diſlocation of one, or more Bones, from the Place where they are naturally jointed.

6 Things requiſite to be known.

Several Things are abſolutely neceſſary for the Cure of *Luxations*. 1. One muſt have a perfect Idea of the Structure of the Parts aggrieved. 2. One muſt know the different Sorts of Luxations. 3. What are the Cauſes. 4. The Signs by which it may be judged that the Bones are diſlocated. 5. The Accidents which ariſe from thence. 6. What may be preſaged thence. And laſtly, the different Means that are to be uſed in the Cure.

Structure of the Parts.

An Idea of the Structure of the Parts may be formed from the Species of the *Articulation*, the *Ligaments*, the *Muſcles*, the *Cartilages*, the *Sinovia*, the *Veſſels*, the *Fat*, and even the *Skin*.

Of

Of the Species of Articulation.

The Species of Articulation.

This repreſents to the Chirurgeon the natural Form and Figure of *Articulation*, which may be by a *Genou*, or Ball and Socket, or by a *Ginglymus*; by a *Genou*, with a large Head, and deep Cavity, as that of the Thigh in the *Iſchium*; or by a *Genou* with large Head and ſhallow Cavity, like the Bone of the Arm with the *Omoplata*; or by a *Genou* with a little Head and ſmall Cavity, like the Joints of the firſt *Phalanges* of the Fingers, with the *Oſſa Metacarpi*, *Metatarſi*, and others.

Genu, or Ball and Socket.

The Joints by *Ginglymus* have ſometimes two Heads, and two Cavities, as the Leg with the Thigh; or three Heads, and three Cavities as the *Cubitus*, the *Humerus*, and others.

Ginglymus.

Of the Nature of Ligaments.

The Ligaments of the Joints are of three Sorts; the firſt ſerve only as Tunicles to retain the *Sinovia*, and to hinder its diffuſing it ſelf any where but about the Joints. The ſecond are as Bands to ſtrengthen the Bones, or to limit their Motions, like the circular Ligaments of the Joints by a *Genou*, the right, oblique, or tranſverſe Ligaments of the Joints by *Ginglymus*, whereof I ſhall make Mention in treating of each in particular.

Ligaments. Three Sorts.

The laſt Sort of Ligaments comprehends thoſe which direct the Motions of the Body, as the Semi-circular Ligaments of the upper and lower Part of the *Radius*, the hinder one of the *Proceſſus Dentiformis*, and ſeveral others.

Of the Diſpoſition of the Muſcles.

Diſpoſition of the Muſcles.

For the Cure of Luxations, the Knowledge of the Diſpoſition of the Muſcles which move the Joints, together with their Number, Force, and Situation, and whether they have Tendons, or *Aponcuroſeis*, is very neceſſary. Without this Knowledge, 'tis impoſſible to have a juſt Idea of the Diſlocation of Bones, or what Meaſures muſt be taken to reduce them. One muſt alſo know which Muſcles are peculiar to the Motion of the Joint, and which only paſs by it, in order to inſert themſelves elſewhere; all which 'tis very requiſite to obſerve, as will be ſeen by the Sequel.

Of Cartilages.

Cartilages: 3 Kinds.

Some Cartilages cover and render ſmooth and poliſhed, the Heads and Cavities of the Bones, others raiſe the Sides; and there is a third Sort, which, without belonging to any of the articular Bones, is placed between both: Theſe are called *Mediums*, this is obſerved in the Articulation of the under Jaw, in that of the Leg with the Thigh, and of the *Cubitus* with the *Carpus*.

Of the Sinovia.

Sinovia.

As to the *Sinovia*, 'tis known that it flows from little Glands near the Ligaments. 'Tis a Liquor ſomething viſcous, but very clear and tranſparent, which falls upon the jointing of the Bones, to facilitate their Motion. What is ſuperfluous is taken back again by abſorbent Pipes or Glands, as the ſuperfluous Moiſture is re-

The Sinovial Glands.

taken

taken by the *Punctа lachrymalia*, as the *Lympha* of the Ventricles of the Brain is conducted to the pituitary *Gland* by the *Infundibulum*; or laſtly, as the *Lympha* of the *Pericardium*, with that of the Cavity of the Breaſt, of the *Venter infimus*, and others, are reſum'd by abſorbent Pipes or *Glands*, when there is a Quantity more than neceſſary to lubricate thoſe Parts, and make them ſlip and move eaſily one againſt the other.

Abſorbent Glands.

other abſorbent Glands.

Of the Paſſage of the Veſſels.

One muſt obſerve what Courſe the great Veſſels take, to avoid preſſing them, either in Extenſions, or in putting on Bandages. Beſides, this Knowledge enables us to give a Reaſon for *Phænomena*, to make our Prognoſtick of the Iſſue, and to determine us ſooner or later to ſet about the Reduction.

Paſſage of the Veſſels.

Of the Fat.

The Fat is neceſſary to be obſerv'd chiefly for the right Application of the Straps, in thoſe who are in good Caſe. It even directs us to general Remedies, and makes us preſcribe a *Regimen* more or leſs ſtrict accordingly.

Fat.

Of the Skin.

As to the Skin, one muſt conſider its Wrinkles, Scars, Wounds, Ulcers, Iſſues, and Defects of Conformation, as Warts, and other Excreſcencies, to the End that one may avoid them, as ſhall be remarked in the Sequel.

Skin. Obſervations.

Upon what has been ſaid, the following Reflections may be made.

Firſt Reflection. The Articulations by a *Ginglymus*,

Firſt Reflection.

mus, are not eaſily diſlocated and their Luxations are almoſt always incompleat, both becauſe they have ſeveral Heads, and ſeveral Cavities, whence a great Part of their Surfaces touch each other; and becauſe their Ligaments are very ſhort, very many, and have different Directions, which renders them very ſtrong.

Second Reflection.

Second Reflection. The Bones that are join'd by *Ginglymus* have their Motion reſtrain'd to Bending and Extenſion.

Third Reflection.

Third Reflection. Thoſe which are join'd by a *Genou* having but one Head, and one Cavity, hardly touch each other but at a Point.

Fourth Reflection.

Fourth Reflection. The Ligaments of the Joints by a *Genou*, are more looſe, and not ſo ſtrong, nor ſo numerous as the others, and have generally but one Direction, except at the Articulation of the Thigh Bone with the Hip.

Fifth Reflection.

Fifth Reflection. The *Genoux* are not at all limited in their Motions, ſince they perform Adduction, Abduction, and Rotation.

Sixth Reflection.

Sixth Reflection. The *Genoux* are always primary, that is to ſay, the firſt Articulation of the Limbs, as may be ſeen by the Articulation of the Arm, which is the firſt of the upper Extremity; by that of the Wriſt, which is the firſt of the Parts of the Hand; and by that of the firſt *Phalanx* of the Fingers; the ſecond and third are joined by a *Ginglymus*.

It is the ſame in the lower Extremity, except the firſt Articulation of the Foot, which is a *Ginglymus*, becauſe the Foot ought to be capable of a greater Reſiſtance than the Hand, to ſuſtain the Weight of the Body.

The *Genoux* being thus Primary, are more liable to Luxations; becauſe in Blows and Falls, the Strain is more felt there, than elſewhere.

Seventh Reflection. For this Reaſon, and all thoſe aforementioned, it is demonſtrable, that the Bones jointed by a *Genou*, are more eaſily diſlocated than thoſe that are join'd by a *Ginglymus*. Seventh Reflection.

Eighth Reflection. 'Tis alſo obſerved that they generally ſuffer a compleat *Luxation*, which is different from the *Ginglymus*, which can hardly ever be compleatly disjointed by an external Cauſe without ſome terrible Accidents happening, often the Loſs of the Limb, and even Death it ſelf; cauſed by the Rupture of the Ligaments, or the Tendons, and ſometimes of the Veſſels, and Membranes. Eighth Reflection.

If we conſider the long Way that a Bone join'd by a *Ginglymus* muſt be forced, to be entirely diſlocated, we cannot wonder at the Diſorders caus'd by its compleat Luxation.

It may alſo be obſerved, that if an incompleat Luxation ſeldom happens to the Bones join'd by a *Genou*, 'tis becauſe their Heads are exactly round, and the Sides of their Cavities very narrow; for which Reaſon the Head being upon the Side, is ſupported only by one Point, whence it ſlips, not being able to ſtay there, and ſometimes re-enters its Cavity, ſometimes falls farther off, amongſt the Parts adjacent. Obſervation.

Nevertheleſs, Authors ſay, that the Bones of the Thigh and Arm may be disjointed more or leſs. This ought not always to be underſtood of an incompleat Luxation, but of a compleat one; when the Bone, being entirely forced out of its Cavity, may be removed to a greater or leſſer Diſtance from it, either by a Contraction of the Muſcles, the Fall of the ſick Perſon, his Motion after the Fall, or the unprofitable Experiments of thoſe who are neither Remark upon Authors.

verſed in the Theory, nor Practice of theſe Diſeaſes.

Ninth Reflection. *Ninth Reflection.* The Diſpoſition and Force of the Muſcles help us to give a Reaſon for the different Figure of the Limbs when diſlocated, and to find the Place where the Head of the Bone lies. It alſo teaches us the eaſieſt Means to ſet it, and how to diſpoſe, place, and proportion the Strength employed for Extenſions, Counter-Extenſions, and Conformations.

Tenth Reflection. *Tenth Reflection.* It is uſeful to have a juſt Idea of the Shape and Figure of Cartilages; eſpecially of thoſe which are *Mediums*, and thoſe which form the Sides of the Cavities; becauſe the one may give Way whil'ſt the Bone is reducing, and one muſt avoid over-ſetting the other in the Cavity, whilſt the Head of the diſlocated Bone is entering into it.

Eleventh Reflection. *Eleventh Reflection.* 'Tis not leſs neceſſary to be skill'd in the Nature of the *Sinovia*, which runs into the Articulation. 'Tis known that this Liquor ſerves to facilitate the Motion of the Joints, as Greaſe does that of Wheels; and that when it abounds too much, and is corrupted and thick, it hinders their Motion. Sometimes it unites the Bones, and ſoders them (if I may ſo ſpeak) which cauſes *Anchiloſes*; or elſe it drives and forces them out of their Cavities, which occaſions troubleſome Luxations. Often it corrodes and rots the Cartilages, and even the Bones themſelves, whence happen Defluxions attended with very fatal Accidents.

Of the Difference of Luxations.

Different Sorts of Luxations. The Kinds and Differences of Luxations are derived from ſeveral Things, *viz.* from the Articulation of the Bone; from the Place it ſettles

tles in when diſlocated, from the Cauſes capable of disjointing it; the Time it has been ſo; and laſtly, from the Diſtempers and Accidents that accompany Luxations.

From the Species of the Articulation.

Species of the Articulation.

Some happen to Bones join'd by a *Genou*, the others to thoſe joined by a *Ginglymus*; to which may be added the opening of the *Sutures*, the diſplacing of the Teeth, and the Separation of the Bones joined by a Cartilage.

From the Place where the Bone ſettles when diſlocated.

Place where the Bone ſettles.

Luxations are compleat, when the Bone is forced out of its Cavity; and incompleat, when it reſts upon the Edge of it, or elſe if there are divers Heads and Cavities; 'tis alſo called incompleat if one of the Heads lodges in the neighbouring Cavity; as when the external *Condyle* of the *Femur* ſlips into the internal Cavity of the *Tibia*.

Remark.

As to the Place, one may again ſay, that the Luxation is internal, when the Bone is driven inwards; that it is external, when 'tis forc'd outwards; that 'tis upwards, when the Bone is thruſt upwards, and downwards, when fallen downwards: And they compound theſe Terms when the Situation is combined, as when the diſlocated Bone has taken a Diagonal, equally near to the inward and upper, or to the inward and lower Part, and ſo of the reſt.

Of

Of the Causes of Luxation.

Causes. There are two Sorts of Luxations, the one proceed from internal Causes, the other from external.

Of Luxations proceeding from internal Causes.

Internal Causes. Some are produced by the Convulsion of the Muscles, others by the weakness of the Ligaments, some by the Palsy, together with the Weight of the Body, or of the Limb only, and others again by a serous Matter, whereby the Ligaments are sodden and relaxed. There are some that are caused by the *Sinovia*, which forces the Head of the Bone out of its Cavity, and others that happen from the swelling of the Bone it self, as one sees in Rickety Persons, or such as live in fenny Places, or work in Lead, Quick-silver, and other Mines.

There are Six.

Of the Difference of Luxations, derived from the Diseases and Accidents attending them.

Luxation. Simple. Compound. The one are called Simple, because not accompanied with any grievous Distempers or Accidents; others are Compound, because several Bones happen to be dislocated; and such as are attended with Impostthumes, Wounds, Ulcers, Fractures, insupportable Pain, Fevers, want of Sleep, Convulsions, or the Palsy, are termed complicated.

Complicated.

Of the Causes.

'Tis necessary to examine the Causes of Luxations, which were mentioned in speaking of the dif-

different Kinds of them: I will begin by the firſt of the internal Cauſes, that is, permanent Convulſions.

Explication of the Cauſes.

'Tis eaſy to conceive, that if the Muſcles which extend a Part, remain long contracted, thoſe which are deſtined to a contrary Motion, being no longer able to keep it in an *Æquilibrium*, the Head of the Bone muſt be forced towards the relaxed Muſcles, and the Limb will be driven on the contrary Side by the Muſcles that are convulſed, as is often ſeen in Cramps.

Permanent Convulſions.

The Palſy.

The Weakneſs of the Ligaments, the Palſy, and the Weight of a Part, are great Cauſes of Luxations: For Example, if the Ligaments that join the *Humerus* with the Shoulder are relaxed, or the Muſcles, that move the Arm, paralitick, the Weight of the Part will force the Head of the *Humerus* out of the Cavity of the Shoulder, becauſe the Ligaments can no longer withhold it, nor have the Muſcles Strength to ſuſtain the Arm.

Relaxation of the Ligaments.

'Tis not to be wondered at if the Bones are diſlocated, when a ſerous Matter overflowing, drenches and relaxes the Ligaments that ſerve to ſtrengthen the Joint, altho' the Muſcles are not paralitick; becauſe that the latter are not always contracted, and the Weight of the Limb acts at all Times.

Remarks.

It's obſervable, that the Ligaments of the Joints ſerve, together with the Muſcles, to maintain the articulated Bones in their right Poſition; and that they ſucceed each other in this Office, as it were to relieve one another, not being always contracted together; for which Reaſon there happen Luxations by the Relaxation of the Ligaments, tho' the Muſcles are ſound; and in the Palſy the ſame falls out, tho'

the

the Ligaments retain entirely their elaſtic Force.

The Sinovia the Cauſe of Luxation.

The Redundance of the *Sinovia* will force the Bones from their Sockets by little and little; becauſe in Proportion as this Liquor increaſes, it removes the Head of the Bone from its Cavity, which is the Cauſe of Luxation, and often of an *Anchiloſis*.

Extern al Cauſes.

That Strainings, Blows, or Falls, ſhould cauſe Luxations, is not at all extraordinary; 'tis ſeen every Day; but it hardly ever happens but when the Limbs are at a Diſtance from the Body, as we ſhall remark in the ſequel of this Diſcourſe.

Of the Diagnoſtick Signs.

Diagnoſtick.

Theſe Signs are common or proper.

Common. Proper.

The common are thoſe which are met with in all Luxations; and the proper are thoſe by which we diſtinguiſh every Species.

The common Signs are Pain, and the Weakneſs of the Limb. The proper ones are the Hollow that is found at the Place from whence the Bone is forced, and the Riſing that is obſerved where it has ſettled; the Limb is longer or ſhorter, and turns to one Side or t'other, according to the different Kinds of Diſlocation, which ſhall be explained at full Length, when I enter upon an Enumeration of the Signs by which we know a compleat Luxation from an incompleat one, and thoſe which proceed from an internal Cauſe from thoſe which happen thro' an external one, whether upwards, downwards, *Anterior* or *Poſterior*.

Common and equivocal Signs.

'Tis obſerved that the Pain and Weakneſs of a Limb are not only common, but equivocal Signs. There are Perſons ſo ſuſceptible of Pain, that the

the leaſt is intolerable to them; and then the Weakneſs, or Inability of moving rhe Part may ariſe from the Fear of ſuffering. On the other Hand, there are People who bear Pain with Patience, and will let the diſlocated Parts be moved without complaining.

Of the Signs of an incompleat Luxation.

Signs of an incompleat Luxation.

1. The Joint is raiſed higher than it ſhould be.

2. The Limb hardly changes its Figure or Length.

3. The Part is almoſt indifferent; or, to ſpeak more properly, is not more diſpoſed to move on one Side than t'other, which is not ſo in a compleat Luxation.

4. The Pains are more acute than in a compleat Luxation. Let us give the Reaſons for all theſe Things.

Explication of the Signs.

The Joint appears higher than it ought to be, becauſe the Head of the Bone is raiſed upon the Side of the Cavity, which makes it take a Sally outwards.

The Limb hardly changes its Figure, or Length, becauſe the Head of the Bone ſcarcely removes from the Center of the Cavity; or, at leaſt, a great deal leſs than in a compleat Luxation.

The Part is not more diſpoſed to move on one Side than t'other, becauſe the Muſcles are almoſt equally extended, ſeeing that the Removal of the Head of the Bone is almoſt at an equal Diſtance from their Origin.

The Patients Pains are much more ſharp than in a compleat Luxation; eſpecially when the Sides of the Cavity are high, becauſe the Ligaments and Muſcles ſuffer a greater Extenſion

when

when the Head of the Bone rests upon the Side of its Socket, than when 'tis entirely out; it is not altogether the same if the Sides of the Cavity are less raised.

Of the Signs of Luxation proceeding from internal Causes.

Signs of internal Causes mentioned by Authors.

1. The Part is unsteady as if it hung by a Thread, because it is always paralitick, which is sometimes the Cause, and sometimes the Effect of the Luxation.

2. A void Space is felt about the Articulation, between the Head of the Bone and the Hollow that receives it, which is the Consequence of the Palsy, the Relaxation of the Ligaments, and the Weight of the Part affected, which endeavours to separate the articulated Bones from each other. 3. The Bone is easily reduced, and as easily displaced again; because the Ligaments and Muscles having lost their elastick Faculties, can neither resist the Operation of reducing the Bone, nor retain it in its right Position, when replaced.

The Part is longer than usual, because neither the Muscles nor Ligaments perform their Office; wherefore the Limb is drawn out by its own Weight.

These are the Signs given us by Authors, but they are not sufficient, since they are only to be met with in the Luxations of the upper Extremities proceeding from internal Causes, thro' the Palsy of the Muscles, and the Relaxation of the Ligaments. Wherefore it must be shown, that they seldom are found in the lower Extremities, and moreover, that there are some Signs that show when the Luxation is caused by the Palsy, others when it proceeds from Convulsi-

Other Signs.

ons,

ons, and others again when it is from the Relaxation of the Ligaments, or the Redundance of the *Sinovia*.

I ſay that all theſe Signs are only met with in Luxations proceeding from internal Cauſes, that affect the upper Extremities, thro' the Palſy of the Muſcles, together with the Relaxation of the Ligaments; becauſe that then nothing but the Weight of the Arm can remove the Head of the Bone, and make the Limb longer. 'Tis not the ſame with the lower Extremity, which ſerves to ſuſtain the Body, and is not pendant, wherefore it muſt rather be ſhorten'd than lengthen'd, if the Weight of the Body acts upon it. Remark.

The Signs of the Luxation's being cauſed by the Palſy are. 1. The leanneſs of the Part, which often feels but little Pain, and the Bone is eaſily reduced. 2. The Difficulty of containing the Bone when replaced. 3. The Limbs that are diſlocated by the Relaxation of the Ligaments, without the Muſcles being paralitick, are not lean; they are ſenſible of Pain, the Joints ſwell, the Limb is ſhortened and liable to all the Diſtortions which the Contraction of the Muſcles cauſes in other Luxations. Signs of the Palſy, and relaxing of the Ligaments. Remarks.

Beſides, leſs Strength is requiſite to reduce theſe, than thoſe which proceed from external Cauſes; neither need the Bandages that contain them be ſo ſtrong, as we ſhall obſerve in treating of them ſeverally. Remarks.

Luxations proceeding from an internal Cauſe produced by Convulſions, are attended with Pain, both when they commence, whilſt they are compleating, and when compleated. They are very hard to reduce, as ſhall be ſhown in particular in the Courſe of this Work. Convulſions, the Cauſe of Diſlocations.

'Twill

Signs of the Superfluity of the Sinovia.

'Twill be known that the Luxation is caused by the Superfluity and Coagulation of the *Sinovia*, when 'tis impossible to make the Bone re-enter its Cavity, although it is easy to bring it both to the Edges of it, and beyond them: Besides, one shall be sensible of a Resistance in endeavouring to force its Entrance, and one shall hear a Noise like that which is made by kneading Fuller'sEarth.

The Swelling of the Bones the Cause of Luxations.

Children that have the Rickets are subject to Luxations, caused by the swelling of the Heads and Cavities of the Bones; because the Heads grow larger, and the Cavities are filled up by the Tumour at one and the same Time, whence there is no longer any Proportion between the one and the other, and the Bones separate and dislocate. The same Thing happens in Luxations that proceed from Strains in hard Labour.

Observation.

A Child had its Thigh disjointed by the ill Management of a Midwife, in bringing it with the Feet foremost; which was not perceived till five Years afterwards. They advised with me to know my Opinion, which was, that this Luxation was absolutely incurable, and that for two Reasons.

Incurable Luxation.

First Reason.

The first is, its long standing: The fresh ones of a Month or two sometimes recover, but one ought not to hope to cure one of five Years.

Second Reason.

The second Reason why this Luxation was incurable after five Years, is, that at the Birth, all the bony Parts are so tender that they grow quickly, and with Ease: In growing they acquire Hardness, and either don't retain, or don't take their usual Shape, but by adapting themselves to each other: Wherefore the Head of the *Femur*, after five Years, is no longer of a round Figure, and the Cavity of the *Ischion* must be

be worn out, by Reaſon of its not being uſed; ſo that theſe two Parts which muſt grow at the ſame Time, not being able to mould themſelves to each other, and preſerve the Relaxation that ought to be between the Pieces that compoſe this Articulation, it is impoſſible to replace them in their natural State. 'Tis certain, that the Head of the *Femur* had formed it ſelf a new Reſidence, at the Expence of the Parts near the ſtrange Place where it has ſettled.

'Tis even reaſonable to think, that if at preſent this Thigh ſhould happen, by any violent Fall, to be forced from the ſtrange Place where it is, the Surgeon would be obliged to re-inſtate it in the ſame: For altho' a Stranger, five Years Reſidence therein has naturalized it thereunto, and the Cavity of the *Iſchion*, formerly its natural abode, would then be a ſtrange Place to it. Reflection.

Signs which ſhew the Place where the Bone is ſettled.

The Bones diſlocate upwards, downwards, forwards, or backwards; and each of theſe Luxations is diſtinguiſhed by the following Signs. Different Signs.

'Tis a general Rule that when a Bone is disjointed, the End of the ſame Bone which is oppoſite to the Luxation will be on the contrary Side to where the Head is. If the End of the Bone oppoſite to that which is disjointed turns outwards, the Diſlocation is inwards; if it turns inwards, the Luxation is outwards; and ſo of the reſt, except in ſome Luxations proceeding from internal Cauſes, as has been juſt obſerved. Of general Rules.

What I have ſaid generally happens only by Reaſon of the Head of the Bone's removing from, or drawing near to the Muſcles that move the Bone.

Explanation. In order to comprehend this, it is to be obſerved, that in their natural State, the Muſcles of the Articulations are almoſt equally diſtant from the *Fulcrum* of the Bone: But if the Bone diſlocates, it draws near to the Origin of ſome Muſcles, and removes from that of ſome others: Thoſe to which the Bone approaches muſt be relaxed, and the others very much ſtretch'd. The firſt will be (as one may ſay) without Action, which will give the others the Opportunity of drawing the Part on their Side; conſequently if the Head of the Arm-Bone is forced inwards, the Elbow will be turned outwards.

There are beſides an infinite Number of Signs, but as they are peculiar to each diſlocated Part, I ſhall only mention them in the particular Account of each Luxation

Of the Accidents.

Accidents of Luxations. The Accidents that attend Luxations are, Pain, Loſs of Motion, convulſive Twitchings, the Palſy, Reſtleſsneſs, Inflammations, Gangrenes, Rattling, *Anchiloſes*, Numbneſs, and others, which ſhall be explained in the Sequel.

Aphoriſms of Uſe in prognoſticating.

1. The Luxation of a *Ginglymus* is more dangerous than that of a *Genu*.

2. The compleat Luxation is more dangerous than that which is incompleat.

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3. A Luxation from an internal Cauſe is harder to be cured, than that which is from an external one; and very often 'tis incurable thro' the Difficulty of deſtroying the Cauſe.

4. Old Diſlocations are harder to reduce than thoſe newly contracted.

5. Thoſe which are attended with Fractures, *Anchiloſes*, Impoſthumes, Wounds, Ulcers, and other Diſeaſes, are very dangerous; becauſe each of theſe Diſtempers requires a particular Cure, the which is, in itſelf, rendered difficult by the Luxation that accompanies it.

6. The Articulations that have many Muſcles are difficult to be diſlocated, or reduced, becauſe the Stroke or the Fall, muſt force the Muſcles to be able to diſplace the Bone, and one muſt get the better of their Reſiſtance, and extend them in order to reinſtate it in its Socket.

7. The Limbs of young People, and Women, diſlocate more eaſily than thoſe of People in Years, and ſtrong Men; becauſe the Muſcles have leſs Force in the one than in the others.

8. The more difficult a Limb is to luxate, the more painful its Diſlocation is; becauſe the Ligaments, Tendons, and Muſcles, ſuffer a more violent Diſtenſion.

9. If the Patient feels great Pain in the Joint, after the Surgeon has uſed his Endeavours to reduce the Bone, 'tis a Sign the Reduction is not perfect, that ſome Tendons or Ligaments have been ſtretch'd, or elſe that the Head of the Bone preſſes ſome Part of a Ligament between it and the Socket.

10. Luxations cauſed by the gathering of the *Sinovia*, are more difficult to cure, than thoſe which proceed from the Relaxation of the Ligaments, by Reaſon that 'tis harder for the

Medicines to penetrate to the Joint where the *Sinovia* lies, than to the Sides where the Ligaments are.

11. The incompleat Diſlocations in the Rickets vaniſh of themſelves when the Bones of the Children unknit, provided they are hindered from walking exceſſively. The compleat Luxations are incurable.

12. When rickety Children fall, they are more ſubject to break their Limbs, than diſlocate them; unleſs there be already ſome Diſpoſition in them towards a Luxation, proceeding from an internal Cauſe; and this, by Reaſon that their Bones are ſoft, and bend, and have not Force to reſiſt againſt the Articulation ſufficiently to diſlodge the Bone from its Cavity.

13. A Luxation cauſed by the Palſy or Convulſions, is a leſs troubleſome Diſtemper than its Cauſe; it is eaſily reduced, and as eaſily diſplaced; ſo that the Bone is with Difficulty kept in its Cavity.

14. That which is the Conſequence of the Palſy, is infinitely longer in curing, than that which proceeds from Convulſions.

I ſhall enter upon the Particulars of Prognoſtication when I treat of the ſeveral Sorts of Luxations.

Of the Cure of Luxations.

The Cure; 3 Things neceſſary.

Luxations indicate three Things for their Cure. The Firſt is to reduce the diſlocated Bone. The Second is to keep it in its right Place when reduced. And the Third is to correct preſent, and prevent future Accidents.

A curative Indication.

The firſt Indication is called Curative, becauſe it preciſely ſhews us what muſt be done for the Cure

Cure of the Patient. Now what muſt be done is to reduce the Bone, which cannot always be brought about, becauſe of the following Complications.

If there happen to be a Fracture, great Tenſion, or violent Contuſion, it is impoſſible to reduce the Luxation. For Inſtance, if the Arm Bone were broken in the middle, and ſlipt at the Shoulder, one muſt abſolutely give over the Luxation, becauſe 'twould be impoſſible to make the Extenſions neceſſary to reduce it, unleſs it be in the Caſe laid down in the Sequel. A Counter-Indication.

When there is a Swelling cauſed by a violent Contuſion, and not by the preſſing of the Head of the diſlocated Bone upon the Veſſels, or other Parts; one muſt firſt of all endeavour to cure the Tenſion, Contuſion, or Swelling; both becauſe theſe Accidents are troubleſome in themſelves, and hinder the making of the neceſſary Extenſions, and becauſe they very often render the Knowledge of the Diſtemper uncertain and difficult. But if the Tumour happens thro' the preſſing of the ſanguinary Veſſels by the Head of the disjointed Bone, it muſt be reduced as ſoon as poſſible, and by that Means the Swelling will ceaſe. A Counter-Indication.

Sharp Pain does not hinder the reducing the Part inſtantly, but when the ſtrange Situation of the diſlocated Bone is not the only Cauſe of it.

There are three Things to be done to reduce a diſlocated Bone, *viz.* Extenſion, Counter-Extenſion, and the guiding the Bone into its Socket. 3 Operations in reducing the Bone,

We ſhall call the Motion that we make in drawing the indiſpoſed Part to us, Extenſion, and we ſhall term Counter-Extenſion the Endeavours we uſe to draw the Part affected to- Explanation.

wards the Body, or to with-hold the Body, for fear it ſhould yield with the Part affected whilſt one is drawing it to extend it.

An Inſtruction concerning theſe two Operations.

To be fully inſtructed in theſe two Operations, one muſt know why they are done, with what they are done, what muſt be obſerved in doing them, and laſtly, the Signs or Tokens that they are ſucceſsfully finiſhed.

The Extenſion and Counter-Extenſion are made, in order to bring the Head of the Bone even with its right Cavity, to the End that it may be eaſily guided thereunto.

The Means that are made Uſe of.

Theſe two Operations are performed either by our ſelves, or with the Help of Servants; and we make Uſe either of the Hands alone, of Straps, or Machines.

Different Caſes.

They are done by our ſelves, in reducing the lower Jaw, the Fingers, the Wriſt, the Foot, and ſometimes the Elbow, or even the Arm or the Thigh, when they are reduced by the Heel. On all other Occaſions one muſt have Aſſiſtants, who make Uſe of their Hands alone when a ſlight Extenſion ſuffices; of Straps when a ſtronger is requiſite; or laſtly of Machines, when neither the Hands nor the Straps are ſufficient.

Circumſtances to be obſerved.

The Circumſtances to be obſerved in making the Extenſions, and Counter-Extenſions are, 1. That the Body be with-held, drawn, or thruſt upwards, by a Force equal to that wherewith the Limb is pulled downward, otherwiſe the weakeſt would give Way to the ſtrongeſt, and the Extenſion would be imperfect.

2. The Force which draws to make the Extenſion and Counter-Extenſion, muſt be applied, as much as poſſible, to the Parts themſelves that are diſlocated, otherwiſe 'tis unprofitable, and oftentimes hurtful. For Inſtance, if the Luxation

ation of the Arm were to be reduced, one muſt pull the Arm it ſelf, and not the *Cubitus*; thruſt back, or with-hold the Shoulder, and not the Body, becauſe that Part of the Force would be loſt in the Articulation of the Elbow, and in the Adheſions of the *Omoplata*; and one might make ſuch violent Extenſions, as would hurt the Ligaments and Muſcles of thoſe Parts, which might not have Strength enough to reſiſt,

3. The Force both in the one and t'other of theſe Operations, ought to be proportioned to the Diſtance of the Head of the Bone from its Cavity, and to the Strength of the Muſcles which hold them back; for leſs Force is requiſite to draw a Bone towards its Socket, when 'tis upon the Edges of it, than when 'tis three or four Fingers Breadth from it. One muſt alſo pull with leſs Force when reducing the Arm, than when reducing the Thigh, becauſe the Muſcles of the Thigh are ſtronger than thoſe of the Arm.

4. The Part muſt be ſo placed that the Muſcles may be equally ſtretched, without which, thoſe that are moſt contracted would make too much Reſiſtance, and diminiſh the Force of the Extenſion; beſides that they might be torn.

5. The Extenſion muſt be made by degrees, for Fear of breaking the Muſcles by a too ſtrong, and too quick Motion.

6. Care muſt be taken of the Parts upon which the Straps or Machines are faſtened, which pull or thruſt, that one may avoid Contuſions, Excoriation, Scars, or Iſſues in thoſe who have them.

To avoid tearing the Parts, as may happen, one muſt ſtrengthen them with Bolſters, and

Compreſſes; which muſt be particularly obſerved on both Sides of the Paſſage of the Veſſels

7. The Straps muſt be placed neareſt to the *Condyles*, or other Eminences that are capable of retaining them, by giving them a good Hold, becauſe they would ſlip, and be of no Effect, if they were placed elſewhere.

They muſt be bound ſtrongeſt upon ſuch as are Fat, that they may approach the nearer to the ſolid Part of the Limb, otherwiſe the Fat would hinder the Steadineſs of the Strap, which would ſlip with the Fat, over the common Membrane of the Muſcles.

First Sign that the Extenſion is made.

The Signs which ſhew us, that the Extenſion is ſufficient, are, when the Straps that draw contrary-ways, are diſtant enough from each other.

Second Sign.

When a diſlocated Part is bound and faſten'd, ready to be extended, the Muſcles appear, becauſe they ſwell, and ſeem as if preparing to draw to oppoſe the Efforts of the Chirurgeon, or his Machines.

Third Sign.

If during the Time of the Extenſion, the Muſcles ſink, and lengthen, 'tis a Sign that the Bone is in the right Way to its Socket, from whence it is forced, and that the Extenſion is ſufficient.

The guiding the Bone into its Place.

When the Muſcles are found to be ſufficiently lengthen'd, the Bone is guided into its Socket, or Cavity, by the Hands or Machines, by ſlackening gently thoſe which draw, that the Bone may replace itſelf.

Obſervations.

It is not always neceſſary to thruſt it, as is recommended by the Ancients; for the Muſcles and Ligaments themſelves which have not been too much forced, will contract when they are no longer ſtretch'd, which makes the Noiſe that is heard.

If

If the Bone were to be left to the whole working of the Muſcles, one ſhould run the following Riſques.

1. If there is a cartilaginous Border, it may be beaten down when all the Straps are let go together, which may cauſe an *Anchiloſis*, or at leaſt render the Motion very difficult, this would happen particularly in a Luxation of the Thigh.

2. If the Swiftneſs of the Return of the Bone ſhould not break the cartilaginous Border, the Head of the Bone would cauſe a great Contuſion in the Cartilages on every Side.

The Way by which one muſt guide this Bone.

It is therefore neceſſary to guide the Bone gently, at leaſt till one is aſſured that it takes the right Way to its Socket, into which one has ſometimes a great deal of Trouble to make it enter, and at other Times it will re-enter of its ſelf, when one takes the right Way.

Obſervation upon the Head.

This Way is not always the ſhorteſt that the Bone can take to re-enter its Cavity, but 'tis that by which 'tis found that 'twas forced out of it, and one is obliged to follow this Track, even if it ſhould not be the ſhorteſt, both becauſe it is already beaten by the Head of the diſlocated Bone, and becauſe it leads to the opening of the *Sacculus Ligamentoſus*, which has been made by the Sally of the Head of the Bone. If this beaten Track is not followed, another muſt be made both to the great Trouble of the Operator, and Pain of the Patient: Beſides, the Head of the Bone coming to its Cavity by a new Way, and finding no Aperture in the ligamentary Tunicle, carries it along with it into the Socket, which hinders the Reductions being exact, and cauſes Pains,

Tu-

Tumours, Inflamations, Defluxions, and other melancholy Accidents.

The other Cauſes which render the introducing the Bone difficult, are the Glears which gather in the Socket, (which happens in old Luxations) the Border of the Cavities being broken or over-turn'd, or laſtly its being fill'd with Air.

If the Edge of the Ligament is not broken, the Air will oppoſe the introducing of the Bone, becauſe the Head will cloſe in ſo juſtly with the ligamentary Circle, that the Air will not be able to get out, but by a violent Impulſion of the Head of the Bone, and 'tis this Air, ſo preſs'd and forc'd out, which makes the Noiſe that is often heard in reducing Luxations, one may even be aſſured that without it the Percuſſion or Claſhing of two Bones would not be perceptible to the Ear.

The Means to retain the Bone in its Socket.

The ſecond Thing in which the Cure of Luxations conſiſts, is to retain the reduc'd Bone by the Application of Bandages, and the Situation of the Patient: The Application of Bandages is leſs neceſſary in Luxations proceeding from external Cauſes, than in thoſe produced by internal Ones; becauſe in the former the Muſcles retain the Part better than all the Bandages whatſoever; but they are abſolutely in the latter, eſpecially ſuch as happen thro' the Relaxation of the Ligaments, or the Palſy; and there is the ſame Neceſſity for them in old Luxations from external Cauſes, where a Palſy has ſeiz'd upon the Patient, or the Part is inclin'd to an *Anchiloſis*: The Bandage alſo muſt be a little harder bound than that which is made Uſe of in

Obſervations.

Lux-

Luxations, that are recent, and proceed from external Cauſes, becauſe that in moſt part of theſe the Bandage only ſerves to keep on the Bolſters, and Medicines that are laid upon the Part.

The Dreſſings.

Theſe Bandages are made with Compreſſes, and Swathes roll'd, which are longer or ſhorter, according as 'tis neceſſary to retain the Bone in its Socket, or only to keep on the Bolſters and Defenſives that are laid upon the Part affected.

The proper Situation of the Body and the Part.

By the Situation, is meant, the Manner of placing either the whole Body, or the Part alone, in a convenient Poſture. The proper Situation of the Body, in all Luxations of the Trunk, or lower Extremities, is to be laid down, but it is not requiſite for the Patient to keep his Bed in Diſlocations of the Jaw, and the upper Extremities.

To place the Part right, Care muſt be taken that no Muſcle be conſtrained, and that the Fluids be not hindered from circulating; to this end one muſt have regard to five Things.

The Condition of the Situation.

The firſt is, that the Limb neither be too bent, nor too much extended: The Muſcles are in Contraction either to bend, or ſtretch out, wherefore one muſt give the Part a middling Situation, in which it may be equally contracted and extended.

The ſecond is, that the Limb be equally ſupported; if any Part is not ſuſtain'd, the Muſcles ſtrain to bear it up, and ſupply the want of the Stay, which cauſes ſharp Pains.

The third Thing to be taken Care of, in placing well the Part affected, is, that the Bending downwards does not hinder the Return of the Fluids: If the Extremity of the Limb that is hurt ſhould hang too low, there would hap-

happen a Tumour, Tenſion, Defluxion, or Impoſthume.

The fourth is, that what ſerves to ſupport the Part muſt be ſoft, to the End that the Patient may not be incommoded, which would oblige him to Motions that may be very hurtful.

The fifth Thing is, to ſecure the Part indiſpoſed, which depends upon the Solidity of the Bed in Luxations of the Trunk, and inferiour Parts, and upon the Regularity of the Scarf in thoſe of the upper Parts; and one muſt obſerve to lay the Patient in ſuch a Manner, that he may be conveniently dreſs'd, wherefore one muſt place the Part that's indiſpos'd on the outer Side of the Bed.

The Cure and Correction of Accidents.

The third eſſential Thing in the Cure of Luxations, is to deſtroy the preſent, and prevent future Accidents. I ſhall treat of each of theſe; I begin by Pain, and Loſs of Motion.

Inability of moving Pain, the Accidents that attend Luxations.

I have ſaid, in ſpeaking of the Signs in general, that Pain and Loſs of Motion, muſt not be laways looked upon as certain Signs of Luxations, but they are always the Accidents that attend them. Pain is not a Sign; there are ſome who diſquiet themſelves for a very Trifle, and others who are patient altho' they ſuffer very much; and 'tis not to be wondered at if ſome Perſons are in great Torture, without there being any Diſlocation; and that others have Luxations without being ſenſible of any great Uneaſineſs: 'Tis eaſily conceived alſo, that a Perſon very ſenſible of Pain will avoid all Sorts of Motions that may excite it, and that one muſt not confound the Inability of moving, which proceeds from the diſplacing of the Bones, with that which only comes from the Means of Fear of Suffering. The Pain and Inability of moving

moving the Limb, which always accompanies Luxations, uſually ceaſes when the Bone is reduced: I ſay uſually, becauſe ſometimes both the one, and the other, remain, altho' the Bone is reduced; by Reaſon that the violent pulling may cauſe an Extenſion, or Ruptures of the Fibres in the Muſcles, and nervous Parts. removing the Pain and Inability.

There are often Contuſions ſo ſtrong, as to cauſe Tumours and painful Swellings: In that Caſe we make uſe of Bleeding, and Narcoticks, and we apply Cataplaſms, Liniments, Fomentations, and other topical Remedies, to the Part, which ought to be Emollients, Anodynes, and Diſſolvents. Contuſions. Their Cure.

Convulſive Motions are cauſed by the ſtretching of the Nerves, or nervous Parts; but they generally ceaſe when the Bone is reduced. Convulſive Motions.

A Fever often happens thro' acute Pains, often it does not appear till the third or fifth Day. This laſt is excited by an Irritation cauſed by ſome Matter infiltrated, or diffuſed; or by an Inflammation, which is always attended with a Fever. The whole is cured by great Bleedings, Diet, and other general Remedies; one muſt even lay ſuch Anodynes and Narcoticks upon the Part, as won't cloſe the Pores, and they may likewiſe be given inwardly. Fever. Its Cauſe. The Cure.

The Gangrene does not happen to the diſlocated Part, but always below it, unleſs there be a Wound. It is cauſed by the Compreſſion of the Nerves, and Blood Veſſels, as well as the Palſy, which is ſeen in the Luxations of the *Vertebræ*, and every where elſe where the diſlocated Bones preſs upon the Veſſels, and hinder the Diſtribution of the Blood, and animal Spirits. Gangrene. The Cauſe.

The beſt Way of avoiding it, is to make the Reduction; but if the Bones have been long The Cure.

diſlo-

dislocated, or the Vessels bruised in reducing them; both these Causes interrupting the Circulation of the Blood, may occasion a Gangrene that requires a particular Cure, which is amply described in the Chapter of the Luxation of the *Vertebræ*.

Another Gangrene.

Rattling. The Rattling which follows Luxations, is either caused by the Want of the *Sinovia*, or by too great Abundance of it. 'Tis a Noise that is made in moving the Limb, either by the rubbing of the Cartilages that are too dry, or by the *Sinovia*'s owzing in too great Quantity; or perhaps also by the Air which is joined with it.

The Cure. If there is not a sufficient Quantity of the *Sinovia*, one must anoint the Articulation with penetrating Oil, and apply emollient Fomentations to supply the Defect of it.

If the Rattling proceeds from the Excess of the *Sinovia*, one must move the Part, and apply to it spirituous Dissolvents. When in Spite of all these Precautions there happens an *Anchilosis*, it must be managed as shall be mentioned in speaking of that Distemper.

If there is a Wound. If there chances to be a Wound, a Bandage must be made, as in a complicated Fracture, to the End that the Part may be kept in its right Position without moving. This Bandage must not be tight, because that in both these Diseases it only serves to keep on the Remedies that are applied to the Part.

If there be an Imposthume. If there be an Imposthume, it must be managed according to its Age and Termination; and if it suppurates, it must be opened in good Time without waiting for its Maturity, because the Matter by its Stay may hurt the Parts about the Joint, and even enter into it, which would cause a troublesome Distemper.

When

When the Head of the Bone is forced out with such Violence that it breaks the Ligaments, Tendons, and Skin it self, it must be set in again as soon as possible, and the Wound be dressed according to Art: But for the most Part there comes a Gangrene, and one is obliged to have Recourse to Amputation. A great Complication.

When a Fracture and Luxation meet in the same Bone, one must strive to reduce the Luxation, and then reduce and dress the Fracture. If 'tis impossible to do the first, which happens when the Fracture it near the Articulation, there not being then Hold sufficient to make the Extension, one must deal with them after the following Manner. Fracture and Luxation.

The Fracture must be reduced, and Defensives laid upon the Luxation; and after that Dissolvents and Liquefyers, to the End that the Fluidity of the *Sinovia* may be preserved; and when the *Callus* of fractured Bones is formed, one must make the Extension to reduce the Dislocation. This Method does not always succeed, but there is no other; the only Risque is, that the Luxation may not be reducible after so long a Time, which does not always happen, because that Dislocations are reduced and cured after six Months, a Year, and more, and the *Callus* is firm and hard before that Time. The Cure.

To avoid the Coagulation of the *Sinovia* about the Articulation, during the Cure of the Fracture, and hardening of the *Callus*, Cataplasms should be laid upon the Joint, made with the Pulp of emollient and dissolving Herbs; and when the Bone begins to be solid enough at the Place of its Fracture, one must move the Articulation by little and little, increasing the Motion every Day, in Order to preserve the Precautions.

Sino-

Sinovia in its natural Fluidity, and make the Reduction ſucceſsfully when the *Callus* is ſtrong enough to bear the Extenſions.

The Cure of Luxations proceeding from internal Cauſes.

Luxations proceeding from an internal Cauſe are to be differently managed. If the Convulſion of the Muſcles has forced the Bone from its Socket, the Luxation muſt immediately be reduced and retained in its Place, whilſt one cures the Convulſions, which is done differently according to their Cauſes, of which we ſhan't ſpeak in this Treatiſe.

By Convulſions.

If the Ligaments are relaxed, and the Muſcles Paralitick, the Bone muſt be reduced and retained by a Bandage, and the Situation of the Patient, and Part indiſpoſed, applying ſeveral Times a Day ſpirituous and aromatick Fomentations, after having chafed it with hot Linnen to open the Pores, both to facilitate the Penetration of the topical Remedies, and to give Room for Perſpiration.

The Palſy.

In ſhort, one muſt obſerve the *Regimen*, and uſe the general Remedies; and, as for the Palſy, it requires a particular Cure, but this is not the Place to treat thereof.

The Sinovia.

If the *Sinovia* has increaſed to ſuch a Degree, that it has forced the Bone from its Place, the utmoſt muſt be done to ſet it again, and keep it ſtrongly in. On this Occaſion a Bandage is uſed, which preſſing the Head againſt its Socket, forces the *Sinovia* towards the Circumference, and bringing it nearer the Surface of the Body, conſequently expoſes it the more to the Operation of the Topicks; whence 'tis more eaſy to diſſolve, and diſſipate it by Liquifyers, and Diſſolvents, laid upon the Part. One muſt beſides at every Dreſſing, move the Head a great while in its Socket, ſo that it bruiſes and diſſolves the Humours like a Peſtle in its Mortar,

tar, and renders it capable of perſpiring, or of re-entring into its Receptacles.

The Luxations cauſed by the Swelling of the Heads and Cavities of the Bones, are cured ſometimes, when they are not compleat.

If the ſick Perſon is Ricketty, you will find in the Treatiſe of the Rickets what Remedies are fit for him.

If the Tumour is cauſed by living in marſhy Places, one muſt add to the Chirurgical Operations a *Regimen*, which muſt be hot and dry, as well as the Air into which the Patient ſhould be removed.

Hydragogues agree perfectly well with it, and the Uſe of hot mineral Waters are alſo very beneficial.

If the ſwelling of the Bone proceeds from a ſcrophulous Humour, one muſt uſe ſuch Remedies as are proper for the King's-Evil.

Mercurial Frictions are proper for thoſe in whom the Swelling of the Joints is cauſed by the Virulency of Quick-Silver. I have ſeen this Remedy uſed, and with Succeſs, upon a Gilder's Boy, who had his Leg almoſt entirely diſlocated by Mercury. This makes me believe that the ſame might be uſed for the Cure of Miners, who are afflicted with Swellings in the Bones, and whoſe Joints are warp'd.

CHAP. II.

Of the LUXATION *of the Head.*

THE Head has two *Condyles* on the Sides of the occipital Hole, which are received and jointed in the two oblique ſuperiour Pro-

ceſſes of the firſt *Vertebra*, which forms a GINGLYMUS with two *Heads*, *and two Cavities* limited by Ligaments that are ſhort, ſtrong, and croſs.

The Motion of the Head.

By this Articulation the Head can only bend and extend it ſelf; it turns on each Side by the Means of the jointing of the firſt *Vertebra* with the ſecond; ſeven or eight Pair of very ſtrong Muſcles ſerve to execute all theſe Motions.

Muſcles.

This Articulation, with the ſecond *Vertebra*, belongs not at all to the Head, altho' by its Means it can turn to the Right and to the left; it is entirely formed by the firſt and ſecond *Vertebra*, which is faſtened to the occipital Bone by a very ſtrong Ligament, that takes its Riſe from the *Proceſſus Dentiformis*, and inſerts it ſelf in the Fore-Part of the occipital Hole, which ſtrengthens both the one and the other of theſe Articulations.

What paſſes by the Occipital Hole.

The Occipital Hole, on the Sides whereof are the two *Condyles* which make the Articulation of the Head with the firſt *Vertebra* of the Neck, is that large Opening from whence iſſues the Continuation of the *Medulla Oblongata*, which paſſing thro' all the Holes of the *Vertebræ*, forms the Marrow of the Spine. The *aceeſſory* Nerves, and the *vertebral* Arteries, paſs alſo by the occipital Hole; but the *Carotides* and the *Jugulares* do not. Forgive me this groſs Remark; I had never thought of it, if I had not read the contrary in a *French* Manuſcript newly dictated. Errors of this Nature ſhew plainly that a Man ought to be perfectly acquainted with Things before he pretends to teach them.

A palpable Error.

'Tis almoſt impoſſible that the Head ſhould diſlocate from the firſt *Vertebra*; the ſecond, third, and others are more eaſily disjointed; not that they are leſs fixed, but becauſe they are more diſtant from the Head; and 'tis clear that

that the *Vertebræ* are the eaſier put out, as they are more diſtant from the jointing of the Head, or of the Hip Bones. 'Tis for this Reaſon that thoſe of the Loins are diſlocated with greater Facility than the others, which ſhall be proved more at length. Beſides, the jointing of the Head with the Neck is not made by the Means of the firſt *Vertebræ* only, but the ſecond is alſo ſtrongly faſtened to it. It may be added likewiſe, that the firſt will with Difficulty diſlocate from the ſecond, on Account of the *Apophyſis Odontoides*, which ſerves to limit it; and becauſe this *Apophyſis* is reſtrained and fixed by two Ligaments, the one poſterior, which hinders it from being overthrown backwards; and the other binds it to the anterior Part of the occipital Hole.

We will ſpeak no more of the Cauſes, becauſe we have particularized them very much at length in the general Account; nevertheleſs I can't forbear relating here a tragical Story which may be of ſome Uſe.

The only Son of an Artificer of ſix or ſeven Years of Age, went into the Shop of a Neighbour who was his Father's Acquaintance; in playing with the Child, he put one of his Hands under his Chin, and the other behind his Head, and lifting him up into the Air, told him, *he would ſhew him his Grandfather*, a mean and vulgar Way of Speaking. The Child was no ſooner lifted off the Ground than he grew refractory, diſlocated his Head, and died that Inſtant. His Father (who was immediately told of it) being tranſported with Paſſion, ran after his Neighbour, and not being able to overtake him, threw after him a Sadler's Hammer which he had in his Hand; the ſharp End whereof pierced what is called the Pit of the Neck, and cutting

all the Muſcles, and penetrating the Space between the firſt and ſecond *Vertebra* of the Neck, cut the Marrow of the Spine, whereof he expired the ſame Hour. Thus theſe two Deaths happened almoſt after the ſame Manner.

This Way of playing with Children is but too common with the Vulgar, becauſe they don't know the Danger to which they expoſe them.

Perhaps alſo, the Child had not died if he had not been ſo refractory; for I do not at all doubt but his ſtruggling was one of the principal Cauſes of the Diſlocation of his Head.

'Tis obſerved, in almoſt all hanged Perſons, that the firſt *Vertebra* of the Neck is entirely ſeparated from the ſecond. It may be even the greateſt, and moſt proper Cauſe of their Deaths.

This Obſervation makes me believe the Head and firſt *Vertebra* of the Neck are very difficult to be parted, and that generally when the Head is thought to be diſlocated, 'tis nothing elſe but a Luxation of the firſt *Vertebra* from the ſecond.

Signs and Prognoſticks.

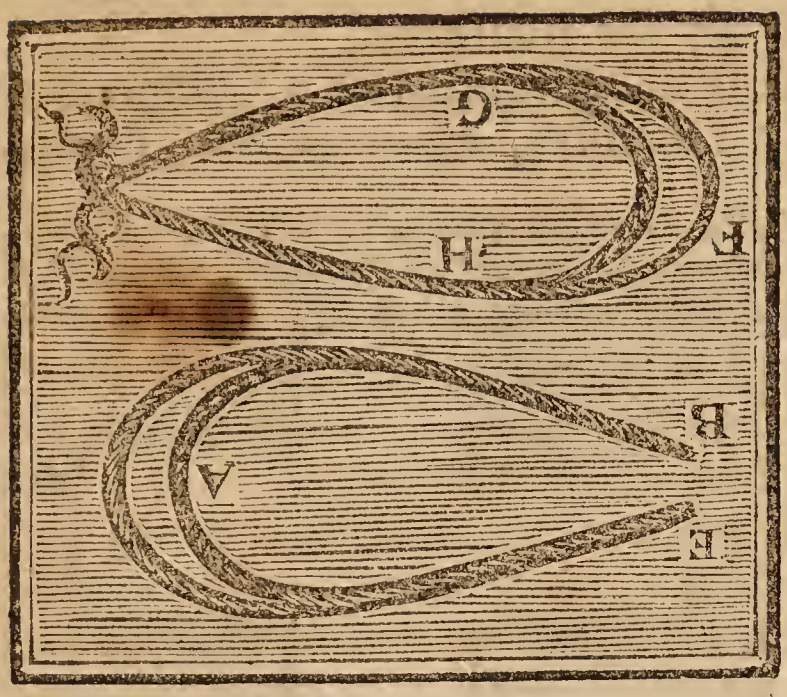
Signs. Prognoſticks.

The Signs are evident, and very fatal, they don't continue long, becauſe the Patient dies either by the Compreſſion, or tearing off the Trunk of the ſpinal Marrow, if the Luxation be not timely reduced.

I fancy 'tis not impoſſible to reduce a Luxation of the Head, eſpecially if 'tis not compleat.

The Reduction muſt be made with a Strap that has a ſlit in the Middle, as 'tis repreſented in this Figure.

The

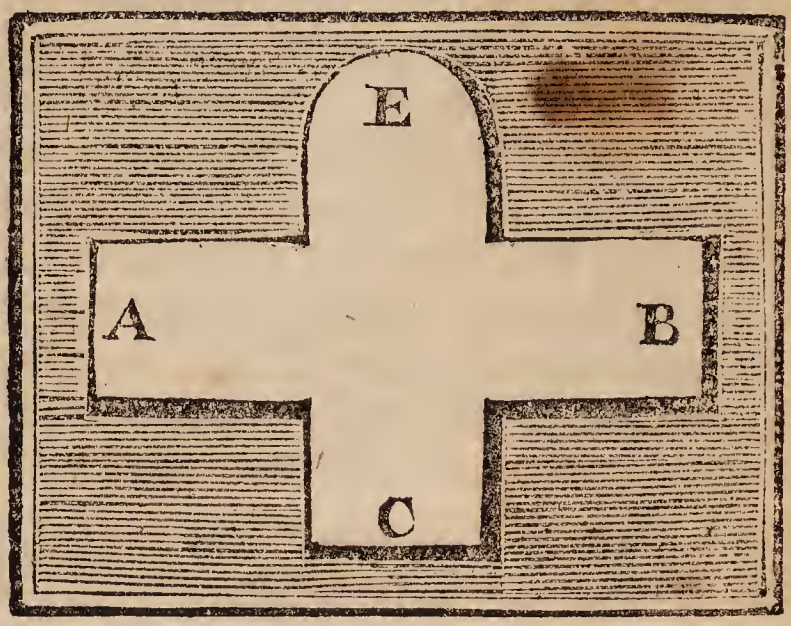


The Head muſt be put thro' the Opening (A) the Sides of the Slit muſt be placed, one under the Chin, the other behind the Nape of the Neck, and the Ends (B) (E) above the Ears; after which they muſt be joined in the Shape of a Handle, upon the Crown of the Head, where the Force muſt be applied to pull.

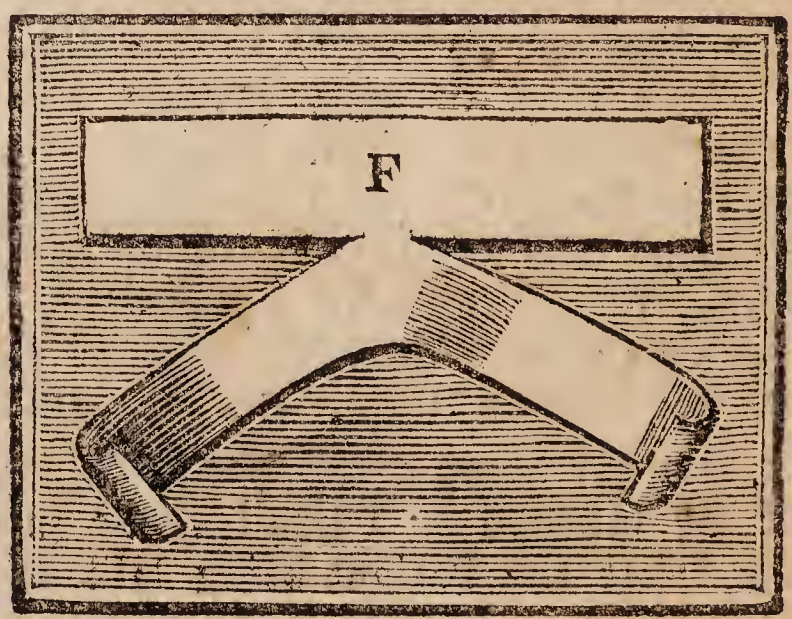
There muſt be another longer Strap, cleft in the ſame Manner, as at (F) in the Slit whereof the Head muſt be put, leaving the Sides upon the Shoulders of the Patient; and paſſing the two Ends (G) (H,) one along the Spine, and the other the whole Length of the Breaſt and Belly, in the Shape of a Scapulary. This done, the Ends muſt be tied together between the Thighs, a Foot below the *Pudenda*; then paſſing another Strap thro' the joining of this, it muſt be faſtened to a fixed Point in ſuch a Manner, that the Patient being laid upon his Back, the Strap is pulled by the Hands, or Machines, whilſt the lower Strap reſiſts at the Point to which 'tis fixed, which makes the Extenſion, and Counter-Extenſion: Then the

Operator ſhould take Care at the ſame Inſtant to thruſt the Head on that Side which is moſt proper for the Reduction.

The Dreſſing. The Dreſſing conſiſts of a Compreſs covered with a Defenſive, made in this Figure.



The Parts (A) (B) fold round the Neck; the Part (C) hangs down the *Vertebræ* of the Neck to the Back; the Part (E) aſcends, and extends it ſelf upon the Occipital.



The whole is kept on by a Sling (F) with four Tails; two are wrapt round the Neck, and the other two meeting at the Forehead, are faſten-

ed

ed round the Head. The middle of the Sling is placed at the Nape of the Neck; the Patient is laid upon his Back, with his Head very high, leaning upon a Cuſhion, hollowed in the Middle, and raiſed on the Sides, to ſerve as a Support to the Sides of the Head, like Junks.

General Remedies.

One muſt bleed plentifully every three Hours, firſt in the Arm, and afterwards in the Foot; this muſt be repeated more or leſs, according to the Nature of the Hurt, and the Strength of the Patient.

Particular Remedies.

In the Beginning, the Juices of Bugloſs, Borage, and Lettice are uſed; three or four Ounces may be given every four Hours, and at Intervals, Broths, with two Drachms of *Syrupus e quinq; Radicibus*, when there is no Fever: An Infuſion is alſo given of the *Swiſs* Vulneraries, eſpecially the Cephalicks, the Belly is kept open by Clyſters, and the Patient, and Aſſiſtants, muſt obſerve a perfect Silence.

CHAP. III.

Of the LUXATION *of the Under Jaw.*

Luxation of the under Jaw. Its Structure.

THE under Jaw is jointed by a double *Genu*, with the two Bones of the Temples, in each of which is a Cavity wherein the *Condyle* of the Jaw is received on each Side. There is a *Median* Cartilage between that which covers the *Condyle* of the Jaw, and that which is over the Cavity of the Temple-Bones. The Ligaments are weak, but the Muſcles are very ſtrong, eſpecially thoſe which raiſe the Jaw, and give it Motion for Maſtication.

The Kinds.

The Jaw diſlocates before, either on both Sides, or one only: Behind, it can neither be

put out directly from Right to Left, nor from Left to Right.

The Impossibility of some Luxations.

The Roots of the *Apophyses Mastoides*, and the hollow of the long Canal of the Ear, hinder the Luxation behind.

Explanation.

The bony Eminence, whence the *Apophysis Stiloides* issues, hinders the Luxation of the Jaw on both Sides, either from Right to Left, or from Left to Right; insomuch that this Dislocation can only happen before, whether one *Condyle* alone, or the two are displaced. The Mouth must be open at the very Time of its Luxation, for as long as it remains shut, no such Thing can befall it; because the *Condyles* will always be turned on the Side that is opposite to the only Road they can take to dislocate.

Of the Diagnostick.

Signs of the Luxation on both Sides.

When the Luxation is on both Sides forwards, the Mouth is open, the Patient can't chew, and the Cheeks are flatted; when one opens the Patient's Mouth he is in great Pain, he can't speak distinctly, his Spittle flows in great Quantity, and runs out of his Mouth involuntarily, and what is most troublesome is, that he can't swallow but with Difficulty, and the Bottom of the Throat is dry.

Explanation of the Signs.

If the Patient can't shut his Mouth to chew, *Aqua pendente* says, it proceeds from the *Corone* of the Jaw's being come down from under the *Zygoma*, and not being able to re-ascend. The same Author says, that this only happens in great Luxations, when there is a considerable displacing of the Jaw, which may very well be: Nevertheless, I believe that it generally happens, because the *Condyles* slip forwards under the *Fulcrum* of the Muscles, and lie in a right

right Line from their Origin to their Inſertion; inſomuch that not being at a ſufficient Diſtance from their *Fulcrum* when they contract themſelves, they can only preſs the *Condyles* againſt the Baſis of the *Cranium*, without being able to move them, which is eaſy to be conceived by thoſe who have any Tincture of Mechanicks.

The Cheeks are flatted, becauſe that the under Jaw being diſplaced, gives an Opportunity to the Muſcles *Buccinatores* to lie level within, whilſt the *Maſſeter* and *Crotaphitis*, make a Sally outwards, becauſe they are in Contraction, as we are going to obſerve. Sequel of the Explanation.

The Patient is in great Pain when his Mouth is opened, becauſe that the Muſcles which ſhut it are ſtretch'd by the too great Diſtance of the Jaw, for which Reaſon, in endeavouring to open it more, one extends and pulls the muſculous Fibres.

He can't ſpeak, becauſe the Lips can't meet, and the Tongue don't touch the Palate nor reach the Lips, which is abſolutely neceſſary in the Pronunciation of Words.

The Spittle flows in great Quantity, and involuntarily; the firſt by Reaſon of the Compreſſion of the ſalival Glands; and the ſecond, becauſe the Tongue can no longer ſend it back to the Bottom of the Throat to be ſwallow'd, and the Lips can't meet to retain it.

The Patient can't ſwallow, becauſe the Tongue no longer touches the Palate, nor has any Motion backwards to ſend down the Food, or the *Saliva* into the *Oeſophagus*.

The Bottom of the Throat is dry, both becauſe the Air paſſes without modifying, and becauſe the Spittle no longer moiſtens, by Reaſon that the Patient throws it out.

When

Signs of a Luxation on one Side.

When the Jaw is only diſlocated on one Side, the Mouth is not ſo open, the Chin is turn'd to the Side oppoſite to that which is diſplaced, the Teeth don't meet with thoſe that are over-againſt them in the upper Jaw, and the Muſcles are ſwell'd but on one Side; all the other Signs agree.

Of the Cauſes.

The Cauſes.

The Cauſes are either internal or external, both the one and the other are ſpecify'd in the general Account of Luxations; to which one may add, that the Jaw muſt be open when it diſlocates, becauſe if it is ſhut, and forced from before backwards, the *Condyles* will meet with the *Apophyſes Maſtoides*, and the bony Canal of the Ear. If it is thruſt on the Sides, the *Condyles* will be withheld by the Protuberancies, whence the *Apophyſes Stiloides* have their Riſe: If the Blow forces it from below upwards, they will meet with the upper Jaw, as has been ſaid before, whence I conclude, that it can only be diſlocated by a Blow that ſtrains it from above downwards. One may add, that the Stroke works its Effect with more Eaſe if the Jaw be gaping; I have never ſeen any others, and great Practitioners affirm the ſame: Nevertheleſs, it is not impoſſible, but it may happen from Blows; but, I believe, the Mouth muſt at leaſt be a little open at the Inſtant of the Stroke or the Fall.

The Mouth muſt be open.

The Jaw ſometimes hard to be diſlocated.

The Jaw is diſlocated with greater Difficulty than many other Parts, not only on Account of what I have juſt ſaid, but becauſe there are two Articulations; that theſe two are diſtant from each other, that they both make Reſiſtance at the ſame Time, and that the Muſ-

cles

cles are very ſtrong, and the more ſo, becauſe they are very ſhort, inſomuch that they reſiſt, and retain it more ſtrongly in its Place.

Notwithſtanding, one ſees ſome in whom the Articulation of the Jaw is ſo looſe, that it often diſlocates in gaping. I have ſet it twice on the ſame Day, and for the ſame Perſon. Obſervation.

Prognoſtick.

Hypocrates ſays, that if the Jaw is not ſpeedily ſet, a high Fever, Heavineſs, Inflamations, Convulſions, and Vomitings of bilious Matter will follow, and even Death it ſelf on the 10th Day. 'Tis what I have never met with, but yet 'tis not impoſſible that it may happen ſo in violent Luxations, by Reaſon of the great pulling and Extenſion of the Nerve, which fills the Canal of the Jaw, and which is one of the great Branches of the fifth Pair, whoſe Origin is very near. Thus this Luxation is not fatal if ſpeedily reduced. Prognoſtick. Aphoriſm of Hypocrates. The Poſſibility. The Reaſon.

Cure.

To make the Reduction, the Patient muſt be ſet upon a Chair, as high as the Breaſt of the Chirurgeon's Servant, who ſupports the hind-part of his Head againſt his Breaſt upon a little Pillow: He muſt hold his Head with both his Hands, which muſt be mutually join'd by the locking of his Fingers, and ſtrongly claſp'd upon the Patient's Fore-head: Thus he draws, claſps, and with-holds the Head, which performs the Office of Counter-Extenſion: Then the Chirurgeon having wrapp'd ſome Linnen about his Thumbs, that he may not hurt them againſt the Teeth, introduces them into the Mouth, The Cure. The Operation.

Mouth, the one on the Right, the other on the Left; he reſts them upon the laſt Grinders, as near as poſſible to the Articulation of the Jaw, thruſting them downwards and backwards; downwards to ſtretch the Muſcles, and afterwards to place the *Condyles*: This done, he raiſes the fore-part of the Jaw, and at the ſame Time he throws his Thumbs into the Cheeks as quick as poſſible, to avoid being bit, which would happen by the Contraction of the Muſcles, which then ſhut the Jaw in an Inſtant.

An ill Method.

There are ſome Chirurgeons who are for performing the Reduction by ſtrong Blows with their Fiſt under the Chin, others make uſe of a Stick, as of a Leaver to open the Jaw. They do this, by reſting it upon the Fore-part of the upper Jaw, whilſt they are uſing their Endeavours upon the laſt Grinders of the under one. I reject both theſe Methods,

For what Reaſon.

which may break the *Inciſores*, cauſe a great deal of Pain, and even hurt the Bottom of the Throat, if the End of the Leaver ſhould ſlip, which is very poſſible.

Another bad Method.

There are ſome who put a Sort of Gag under the Teeth, and then ſtrike the Chin underneath like the firſt; but theſe Ways are entirely wrong, and one cannot uſe them with Succeſs, unleſs the Gag be placed under the laſt *Molares*, without touching the other Teeth: In this Caſe, by bearing upon the Chin, and ſtriking under it, as if to bring the under Jaw near the upper one, whilſt the Gag remains at the Point before-mentioned, perhaps it might be reduced; becauſe the Blows of the Fiſt, or the Force of the Hands, and the Reſiſtance of the Gag, extend the Muſcles, which may thruſt

The difficulty of ſucceeding.

back

back the *Condyles* into their Sockets. But as it is impoſſible to confine a Gag only to the laſt Grinders, I think this Way very difficult in practice, tho' not ſo dangerous as the precedent ones.

If thoſe who make Uſe of a Gag reſt it upon the other Teeth, they will never ſucceed, becauſe the Force that Operates, however conſiderable it may be, is of no Effect when it is near the *Fulcrum*, they would ſooner break the Teeth and the Jaw it ſelf, than reduce it. I have nevertheleſs ſeen ſome reduced by only one blow of the Fiſt without a Gag; but the Luxation was incompleat, and the *Condyles* were not ſo far removed, but that the *Muſcles* were ſtill diſtant enough from their *Fulcrum* to allow of that Reduction; whereas 'tis impoſſible to make the Reduction by the means before mention'd, when the Muſcles paſs by their *Fulcrum*, that is when the *Condyles* are in a right Line from the Origin of the Muſcles to their inſertion. 'Tis in this State that the *Maſſeter* and the *Pterigoides Internus* are; the *Crotaphitis* ſeems more favourably inſerted, it is ſo ſtr etch'd that it can't act.

Incident.

A poſſible Caſe.

The State of the Muſcles.

When the Luxation is but on one ſide, the Extention and other Operations are only made on that ſide. This Luxation is more difficult to reduce than that which is compleat of both *Condyles*, for two Reaſons. The firſt is, That the Muſcles have retain'd more Force, and conſequently make more reſiſtance. The ſecond is, That the Jaw is leſs open, which hinders the introducing the Thumb ſo near the Articulation as is neceſſary to get the better of the Reſiſtance of the Muſcles, whereas 'tis quite contrary in a Luxation in both ſides.

Cure of the Luxation on one ſide.

The Incompleat more difficult than the Compleat

All the Dreſſing conſiſts of a ſimple Defenſive, a Compreſs with four Ends croſswiſe faſtned to the

the Cap. A Regimen and the general Remedies are of no great Uſe, unleſs there be a Complication.

I can't help ſaying *en paſſant*, that this Diſeaſe, which ſeems to be diſtinguiſhable and known at firſt ſight, was nevertheleſs miſtaken, one Day, for an Accident proceeding from an Apoplexy in the *Governante* of the famous Mr. *De Pile*, Author of the Hiſtory of Painters; but having examined her I cou'd find no other Symptom but a difficulty of ſpeaking, cauſed not by an Apoplexy, but by a Luxation of one of the ſides of the Jaw, I made the Reduction, and the Patient inſtantly ſpoke with as much eaſe as before.

CHAP. IV.

Of the LUXATION *of the* Vertebræ.

THE Articulation of the *Vertebræ* is not very eaſy to be deſcrib'd; nevertheleſs it is impoſſible to comprehend well the Manner of their diſlocating, if one has not at leaſt a general Idea of it.

Their Structure

The *Vertebræ* are join'd by their Bodies, and their oblique *Apophyſes*. Their Bodies are flat at Top and Bottom, except the ſix laſt of the Neck, and the two or three firſt of the Back. The union is made by Cartilages and Ligaments.

Cartilages.

The Cartilages have not the Conſiſtence of thoſe which join the other Parts; they are much ſofter, more flexible and capable of yielding to the different Motions of the Body: they become ſmall on that ſide that we ſtoop, and thick, equal-

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ly thick, on the oppoſite quarter. When the Body is ſtrait, and the *Vertebræ* reſt perpendicularly upon each other, they are equally ſmall every where. If we ſtand ſtrait with a Burthen upon our Heads, theſe Cartilages don't take up the whole extent of the Surface whereby the Bodies of the *Vertebræ* are joined to them. They leave about a line and a half in the Circumference, which not being fill'd by the Cartilage, ſerves for a Place of Adheſion to the Ligaments.

'Tis to be remark'd that the Place in the Body of the *Vertebræ* where the Cartilage is faſten'd, is more hollow and more porous than that whereto the Ligaments are fix'd; and this Side which is but one Line broad in the *Vertebræ* of the Neck, one, and one and a half in thoſe of the Back, and two in thoſe of the Loins, is an *Epiphyſis* more raiſed, and leſs porous than that which ſerves for the Adheſion of the Cartilage. This Cartilage which is ſeven Lines thick at the *Vertebræ* of the Loins, is leſs at thoſe of the Neck and Back. Remarks.

The Ligaments of the *Vertebræ* are very numerous, the moſt conſiderable are, firſt thoſe of which we have juſt been ſpeaking, and which I'm going to deſcribe. Ligaments.

Theſe Ligaments (as has been ſaid) are faſten'd from the Body of one *Vertebræ* to another, and take up by their faſtenings all the Side of the *Epiphyſis* before mention'd. Their Fibres have different Directions, there are thoſe which are oblique in a different ſenſe, which croſs each other on the outſide in the form of the Letter X. There are Circular Ones, which ſeem to be of no other Uſe but to bind and ſupport the others; 'tis even remarkable that in their oblique Plans there are others which are perpendicular. Theſe Ligaments don't appear to be terminated at the Side of the flat Surface, they ſeem to paſs over Their Adheſion.

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the round Part of the Body of the under *Vertebræ*, insomuch that these exteriour ligamentous Fibres are look'd upon as one single Ligament, which would fasten all the *Vertebræ* by the exteriour Part of their Bodies, from the Head of the *Os Sacrum* to the second *Vertebræ* of the Neck.

The hinder Ligament.

Another very considerable Ligament is that which is found in the hind Part of the Body of the *Vertebræ*, at the place where they form the anterior Part of the Canal of the *Spinal* Marrow; and which reaches the whole length of it.

Another Articulation.

The Second Articulation of the *Vertebræ* is, that which is made by the oblique *Apophyses*. It is look'd upon by the Ancients as a *Ginglymus*, or Hinge, because each *Vertebra* has four oblique *Apophyses*, the upper ones receive the oblique *Apophyses*; of the Upper *Vertebræ*, and the under ones are received in the two oblique *Apophyses* of the under *Vertebræ*.

What Name ought to be given to the Articulation

These Articulations ought rather to be regarded as double *Genu*, not that they have all the Motions of a real *Genu*, but because their Motions are not confin'd to only the Bending and Extension of the Spines; and the Back-bone cannot move round, without these little *Genus* being moved also.

Oblique Apophyses.

These Oblique *Apophyses* are again cover'd on the Outside of their Articulation by a Ligament, or Ligamentous Tunicle that retains the *Sinovia*; and they are restrain'd, as well as the Body, by several very strong Ligaments.

Their Ligament.

There are some which fasten the *Apophyses Transversales* to each other, others restrain them by their Spiny *Apophyses*, and besides there are others in the inner Part of the Canal of the *Spinal* Marrow, viz. One improper that goes from the Root of one spiny *Apophyses*, to the Root of the other; and one that is commom to all the *Vertebræ* which proceeds inwardly from the Head of

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the *Os Sacrum* to the Root of its first Spiny *Apophysis*, and which passing over all the proper Ligaments, adheres strongly to the inner Part of the Root of the Spiny *Apophysis*, the whole length of the Canal.

The Spinal Muscles.

The Muscles of the Spine are not less difficult to describe, then the Articulation of the *Vertebræ*; but as the Description of them is not so useful for the Understanding Luxations of the *Vertebræ*, I shall content my self with saying that almost all the Muscles are situated at the hind and lateral Parts, and that there is not one before, except at the Neck, where is the long *Flexor*; and part of the *Scalenus*. 'Tis also known that there are Muscles which are common to a great Number of *Vertebræ*, and that there are many which are proper to each.

The Motions of the Spine

All these Muscles move the *Spine* very sensibly at the last *Vertebræ* of the Back: All those of the Loins have a considerable Motion, and even those of the Neck; but the *Vertebræ* of the Back move much less, because they are restrain'd by the Ribs, because the Cartilages of their Bodies are small; and their Spiny *Apophyses* are very long, and lie upon each other.

The Spine moves without hurting the Marrow,

'Tis known that the Spine forms a Canal which contains the Marrow; that the Parts of this Canal must be made so as to be moved without incommoding this Marrow, or the Nerves which issue from behind, and from the Sides of it across the Holes which the *Vertebræ* form by their Conjunction.

Its Luxation difficult.

From this Structure, one may infer several Things; so that the *Vertebræ* must be difficult to luxate, because the Strokes, Falls, or Strains, must get the better of the prodigious Number of Muscles and Ligaments; and that they seem to be secured from it by this Junction of the Bo-

dy of the *Vertebræ*, ſo well cemented by Ligaments and Cartilages, that it ſeems as if Nature, in forming this Union of ſo many Bones, had intended to reconcile Firmneſs with Motion.

2. There are ſeveral Difficulties to ſurmount in the Reduction, but beſides thoſe which we might cite with regard to the Structure of the Part, there is one which ſeems to me not the leaſt, that is, that the means hitherto employ'd for the Remedy of the Diſeaſe, are ſo contrary to it, that they can never ſucceed, which ſhall be demonſtrated.

3. The Marrow of the Spine, the Nerves which iſſue from thence, and conſequently the Organs where theſe Nerves diſtribute themſelves, ought to be the Seat of the Symptoms that attend this Diſtemper; becauſe the Canal of the *Spine* is with reſpect to the Marrow which it contains, what the *Cranium* is to the Brain. What Accidents ought one not to expect if any *Vertebra* ſhould be out of its Place, and what will not the Nerves ſuffer which paſs by the Holes that form their Cavities? If the Marrow is compreſs'd, the inferiour Parts will fall into the Palſy, and Gangrene, and if there are but certain Nerves compreſs'd, the Patient will ſuffer intollerable Pains at the place of Compreſſion, and will have the Palſy in the Parts where the Nerves, ſo compreſs'd, diſtribute themſelves.

4. The Manner of reducing diſlocated *Vertebræ* ought not to be the ſame with that deſcrib'd by the Ancients, and ſtill practiced by the Moderns, to the great Injury of thoſe who are in that melancholly Condition.

'Tis 18 Years ſince I publiſh'd a new Method, founded upon the natural Structure of the Parts; the Deſſection of Bodies, upon Succeſs; and I may venture to ſay, upon the bad iſſue of the ancient

cient Method; no Body has followed it, ſo difficult it is to ſhake off the Yoke of Prepoſſeſſion.

Of their Sorts and Differences.

'Tis difficult, not to ſay impoſſible, that a compleat Luxation ſhou'd happen to the *Vertebræ*, without the Patient's dying upon the Spot, or a little afterwards; and accordingly it is found, that their Luxations are generally incompleat. A compleat Luxation difficult.

We call that a compleat Luxation, when the diſlocated Bone no longer touches that to which it was joined at the Places which made the Junction; and in the uſual and incompleat Luxations of the *Vertebræ*, greateſt Part of their Bodies always touch, inſomuch that they are never diſlocated entirely, but at their oblique *Apophyſes*: One even ſees every Day, that the two oblique *Apophyſes* are not always equally diſlocated, one may be forc'd from its Place, whilſt the other remains almoſt in its natural Poſition. An incompleat Luxation common. Luxation of one Apophyſis.

There are Luxations of one, two, or three *Vertebræ*, which muſt be underſtood in this Manner: for Inſtance, if the firſt *Vertebra* of the Loins is diſlocated from the laſt of the Back, and the laſt of the Loins from the firſt of the *Os Sacrum*, one ought not to ſay, that the five *Vertebræ* of the Loins are luxated; this however is the common way of ſpeaking, but without Reaſon, becauſe the three *Vertebræ* that are between the firſt and the fifth are not diſlocated. Luxation of 1, 2, or 3 Vertebræ. Example

It muſt alſo be remark'd that a *Vertebra* may be put out either at the Top, or at the Bottom, or both together, which happen very ſeldom. Remark.

The *Vertebræ* can never be diſlocated by a Strain on the Side of the Extenſion of the *Spine*, unleſs the Cartilage and Ligaments, which join the Body On what Side the Vertebræ luxate.

dy of the *Vertebræ*, be broken, and in that Caſe the Patient would ſoon die by the Compreſſion, the extraordinary dragging, and even the Rupture of the *Spinal* Marrow.

On what Side the Apophyſes diſlocate.

The oblique *Apophyſes* cannot be luxated after this manner, becauſe the Extenſion of the Spine rather draws them nearer than removes them; thus all Luxations of the *Vertebræ* at their oblique *Apophyſes*, happen only by a Strain on the outſide of the Flexion, whether the Strain is directly before, a little to the Right, or a little to the Left, as ſhall be explain'd immediately.

Firſt Example.

If one ſtrains violently in bending the *Spine* directly forwards, the inferiour oblique *Apophyſes* of one *Vertebra*, will be forced from the Bounds preſcrib'd to them by the ſuperiour oblique *Apophyſes* of the under *Vertebra*, and then there is a Luxation of the two oblique *Apophyſes* of the upper *Vertebra*.

Second Example.

Third Example.

If the Strain happens, on the right Side in bowing the *Spine*, the left oblique *Apophyſes* breaks out from the oblique *Apophyſis* which receives it.

If the Strain happens in the bending the *Spine* on the left Side, there will be a Luxation on the right Side.

Of the Diagnoſtick Signs.

Signs common and proper.

They are common and proper. The common Signs are the deform'd Shape of the whole Body, the difficulty, and ſometimes, impoſſibility of walking, the Numbneſs of the Parts that are beneath the Diſlocation; from whence there follows inſtantly, or ſometime afterwards, a Palſy in the lower Extremities, the Belly becomes bound, the Urine is ſtopt the firſt Days, and afterwards runs involuntarily: Then comes a Mortification, and Death is not far diſtant.

Melancholly Accidents.

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The Shape of the Body is deform'd, becauſe the *Spine* no longer retains its uſual uprightneſs. 1ſt Explanation.

It's difficult, and ſometimes impoſſible, for the Patient to walk, both becauſe the *Spine* being no longer ſtrait, the Weight of the Body is not upon the Line of Gravity; and, becauſe if the Patient tries to replace it there (as hunch back'd People do) in order to walk, all the Motions he makes, are ſo many Shocks, which ſhake and preſs the Spinal Marrow, and cauſe violent Pains, which he will willingly avoid by ceaſing this troubleſome Experiment, 2d Explanation.

What alſo cauſes a Difficulty of walking, is, that the Compreſſion of the Marrow interupts the Courſe of the animal Spirits in the Muſcles of Progreſſion, which are ſometimes not only weakened, but entirely loſe their Elaſticity in 24 Hours, and even ſooner, according to the Degree of Compreſſion which the Marrow and the Nerves ſuffer. Another Reaſon.

The Conſequences of this Compreſſion, are, Numbneſs, Coſtiveneſs of the Belly, the Palſy, ſtoppage of Urine. Involuntary Ejections, and the Gangrene, are the Effects of a Total Compreſſion of the Marrow and Nerves. Third Explanation.

It muſt be obſerved nevertheleſs that the Gangrene comes, firſt, at the Spiny *Apophyſes*, at the *Spines* of the *Oſsa Iſchij*, the Fleſh of the great *Trochanter*, the *Coccix*, and the End of the Buttocks; becauſe the Patient lying always upon his Back, theſe Parts are compreſs'd, by the Weight of the Body, between the Bones and the Bed, whence the Blood Veſſels are depreſſed there, and the Humours ſtopt, ſo much the more, becauſe the Parts that are Paralitick, and have loſt their Elaſtick Force, ſuffer themſelves to ſink down, and can't withſtand the Compreſſion. Obſervation on the Gangrene. Reaſon of theſe things

1. Proper Sign. The proper Signs are four, the first shows us whether one or more *Vertebræ* are luxated.

2. Proper Sign. The 2d whether the Luxation is of two oblique *Apophyses*.

3. Proper Sign. The 3d. If it is at the Right oblique *Apophyses*.

4. Proper Sign. And the 4th, that the Dislocation is at the Left oblique Process.

Sign of several Vertebræ being luxated. When the Luxation is of 2 or 3 *Vertebræ*, the Crookedness of the Spine is greater than when there is but one displaced.

Sign that the Luxation is of two Apophyses. In a Luxation where the two oblique Processes are disjointed, the *Spine* is bent forwards in a right Line, the Patient feels considerable Pain if 'tis bent any more, and on the contrary, he finds Ease, if one straitens it a little; which is caused by reason that in the Flexion, the Ligaments and the *Musculi Extensores*, which are already violently extended, are stretched too much, and when the *Spine* is raised a little, the Patient finds himself eas'd, because the Extension of the Muscles and Ligaments is diminish'd.

An essential Remark. I must make one essential Remark. The Muscles have no share in causing the Deformity of the dislocated Part, as they have in other Luxations; this Distortion proceeds wholly from the displacing of the oblique *Apophyses*, and the *Spine* always throws it self on the Side that is bent, tho' the Muscles don't draw it thither; for notwithstanding the Body is bent, it is drawn backwards by the Contraction of a prodigious Number of the Muscles, wherewith the whole Back of the *Spine* is covered.

Reflection. If the Muscles were in any ways the Cause of this Distortion, the *Spine* wou'd be overturn'd and drawn backwards, and 'tis seen on the contrary, that it keeps bent, even after all the Muscles are

are cut, which I have try'd on ſeveral Bodies of Perſons who have dy'd of this Diſeaſe.

The Signs that the oblique Proceſs of the right Side is diſlocated, are, partly thoſe we have juſt mention'd; to which muſt be added, that the *Spine* bends to the left, that the Patient feels exceſſive Pain if one bows the Body on the Side to which it leans, and that he finds Eaſe if 'tis thruſt towards the Side from whence 'tis luxated. Signs of a Luxation on the Right Side.

When the oblique Proceſs of the left Side is diſlocated, the Body bends to the Right, the Patient is in Pain when one bows the Body on the Side to which it bends; and finds Relief if 'tis thruſt the oppoſite Way. Signs of a Luxation on the left Side.

I ſhall not give any Signs by which to find out the Luxations which are ſaid to happen directly backwards, directly to the Right or on the Left, I believe I have proved ſufficiently that they are impoſſible. I leave the Care of deſcribing their Signs to ſuch as think they have met with them. There are no other Luxations

Prognoſtick.

The *Vertebræ* of the Loins are more eaſily diſlocated than thoſe of the Neck, and theſe again more eaſily than thoſe of the Back. A Remark of Uſe in Prognoſticks.

The *Vertebræ* of the Loins diſlocate with leſs Difficulty than the others. 1. Becauſe they are ſituated in the middle of the Body, or at leaſt at the Part where the Flexion is the ſtrongeſt, and where Strains have moſt Power, as is ſeen by a Stick, which being preſſed at both Ends, is conſiderably more bent in the middle than at its Extremities. First Reaſon.

2. Their oblique *Apophyſes* are more outward than thoſe of the Neck and Back, and conſequently are more expoſed. Second Reaſon.

Third Reason. 30. The *Vertebræ* of the Neck have a Cavity, in the upper Part of their Bodies, which receives the Eminence of the *Vertebræ* above them, which gives them a ſtronger jointing than thoſe of the Loins, whoſe Bodies are flat.

Fourth Reaſon. 4. The Cartilage at the *Vertebræ* of the Loins being thicker, they move with the greater Facility, and 'tis known that Luxations happen moſt frequently, and moſt eaſily, at thoſe Articulations that have the moſt Motion.

Fifth Reaſon. Laſtly the *Vertebræ* of the Back are luxated with moſt Difficulty, becauſe the Flexion of the *Spine* is not great there, and they are moſt ſtrongly jointed with the Ribs.

Cauſe of Danger. All Luxations of the *Vertebræ* are dangerous, which proceeds from two things.

1. Cauſe. Firſt, From the Compreſſion, Commotion, and dragging of the Marrow of the *Spine*, which being only the Extenſion or lengthening out of the Brain, muſt ſuffer infinitely; and 'tis well known of what Importance that is for the moſt uſeful Functions of Life.

2. Cauſe. The Second is from the great Difficulty of reducing the Luxation, eſpecially if one follows the Practice of the Antients.

The moſt dangerous Luxations and why Luxations of the *Vertebræ* of the Neck and Back, are more dangerous than thoſe of the Loins, becauſe there require a greater Strain to disjoint them, and that when they are diſlocated, they compreſs a greater Extent of Marrow; whereas 'tis contrary in the Luxation of the *Vertebræ* of the Loins,

Thus in the Luxation of thoſe of the Neck, there are more Parts Paralitick, becauſe the Nerves which iſſue from the Marrow, at the Neck and Back, have Communication in more Places with the eighth Pair, and the *Intercoſtal*,

before

before it has ſupply'd its Branches that are of the moſt Importance to the Natural Oeconomy.

The Luxation of two or three *Vertebræ* is more troubleſome than the Diſlocation of one only, becauſe the Marrow is compreſs'd in more Places, or in a greater Extent. Luxation of 2 or 3 moſt troubleſome.

The Luxation of two oblique Proceſſes, is leſs difficult to reduce than the Diſlocation of one only. Luxation of 2 oblique Proceſſes.

If the Luxation of the *Vertebræ* is not reduc'd, the Patient muſt infallibly die. If not reduc'd the Patient dies.

The Patient will die tho' it be reduc'd, when it has been deferr'd too long, becauſe Defluxions have followed the Diſlocation; or, becauſe the Marrow and the Nerves, which are ſoft and tender Parts, have been too long compreſs'd to be able to reſume their *Tonus*; thus the Obſtruction does not ceaſe, and the Palſy continues with all the Symptoms. If 'tis deferr'd too long.

Altho' the incompleat Luxation be the moſt difficult to reduce, yet it is leſs dangerous than the compleat one, becauſe the Marrow is leſs compreſs'd in the one than the other. The Incompleat Luxation leaſt dangerous.

I once knew a Soldier who did not die of a Luxation of a *Vertebra*, altho' it was not reduc'd, becauſe this Luxation was occaſion'd by a Strain, which gives me Reaſon to believe that the Diſlocation of the *Vertebræ* is yet more dangerous by the Commotion which a violent Fall cauſes in the Marrow, than by the diſplacing of the Bones. Obſervation.

The Parts may by little and little accuſtom themſelves to the Compreſſion that is occaſioned by the Bones being displac'd, but cannot bear up againſt the Compreſſion, tho' but ſlight, when they have been jarr'd by a violent Shock. Reflection.

From the ſame Reaſon there are Fractures and Depreſſions of the *Cranium*, which are cured without

without trepanning, but these uncommon Cases don't make a Rule.

Of the Cure.

Cure of dislocated Vertebræ.

To reduce the dislocated *Vertebræ*, the Patient must be laid upon his Belly, a cross a Bed three Foot broad, with a large Sheet upon it, rolled up in the shape of a Bolster; this Sheet must be plac'd according to the length of the Bed, and upon it the Belly of the Patient just opposite to the dislocated *Vertebra*; two Assistants must lean, one upon the upper Part of the *Spine*, near the Root of the Neck, and the other upon the *Os Sacrum*, in order to bend the *Spine*; then one must press upon the luxated *Vertebra*, that is to say, upon that which is immediately below the most eminent Part of the Tumour that is visible; at the same Instant they must raise that Part of the Trunk that is towards the Head, and the *Vertebra* is reduced.

How to place the Patient.

A new Method.

One may make the following Remarks upon this new Method.

Essential Remarks.

We have already said, that the Muscles do not change the Figure of the Part, in the Luxation of the *Spine*, altho' they do their Endeavours to extend it; it is the oblique *Apophyses* which, by meeting with the Ends of each other, hinder the *Spine's* streightening, which makes the Attempt of the Muscles fruitless, and this is what has not been observed by those who have written of this Distemper, nor put in Practice by those who every Day attempt these Sorts of Reductions.

Errors of Authors.

'Tis not wonderful to see Authors propose Extensions, Counter Extensions, laying under of Rollers, Leavers, and Presses, in order to reduce luxated *Vertebræ*; it is not, I say, wonderful

ful, becauſe moſt part of thoſe who have written were only Chirurgeons in Theory; Perſons muſt practiſe; that is the Means to learn Surgery, provided they reflect upon what they do, and know how to profit both by their Succeſs and Misfortunes. There are ſome who their whole Lives do nothing but copy their own Faults.

I ſay, that the *Spine* muſt be bent, which is contrary to the uſual Manner of reducing other Luxations, wherein one turns the Limbs on the Side of the Muſcles that are ſtretch'd, in order to relax them. The ſame muſt not be done in reducing the *Vertebræ*, for, in bending the Body, far from relaxing the Muſcles, one extends them; 'tis by this Means that the oblique Proceſſes of diſlocated *Vertebræ* are removed at a Diſtance from each other, and that they eaſily reſume their Places. In following the Method which I have propoſed, it always ſucceeds when 'tis well put in Execution.

There are ſome who never mend.

They, who in order to reduce the *Vertebræ*, make Extenſion, and Counter Extenſion, with Straps, or other Means, can never ſucceed, becauſe all their Endeavours end in ſtraitening the Spine, and that muſt not be done 'till the oblique *Apophyſes* are diſingaged, and no longer touch each other, their touching being the only Cauſe that hinders its becoming ſtrait.

A faulty Method.

They who, hang up the Patient under the Arms, and they who put Sticks and Rollers on the Side of the *Spiny* Proceſſes, and preſs upon them with a Leaver, do at leaſt as wrong as the others; their Endeavours tend only to preſs the oblique Proceſſes againſt one another; but on the contrary, one muſt diſengage them to make them return to their natural Poſition.

Another wrong Method.

The other two ſorts of Luxations of the *Spine*, require almoſt the ſame Operation; neverthe-

Reduction of the two other

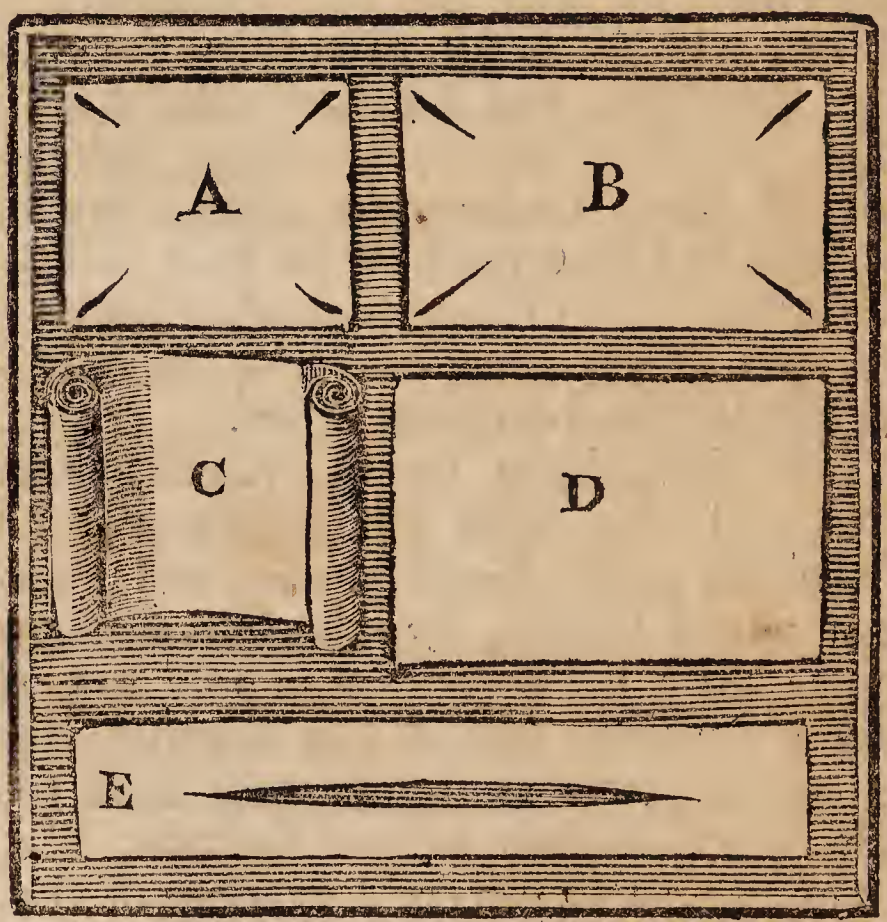
leſs

kinds of Luxation.

leſs it muſt be obſerved, that if the Luxation is at the oblique *Apophyſes* on the Left Side, one muſt bear upon the Bone of the Left Hip, and upon the Right Shoulder; that if 'tis the right oblique *Apophyſes* which is diſlocated, one muſt bear upon the Bone of the right Hip, and upon the left Shoulder, in order to make an unequal Flexion that agrees with the Inequality of the Disjointing.

The Dreſſings.

When the Luxation is reduc'd, the Compreſſes (A) and (B) muſt be laid all over the *Spine*, being kept on by the Bandage for the Body (D), the whole ſupported by the Scapulary (E) and upon the Belly they put the Belly-Band (C). The Patient muſt be laid upon his Back in a ſmooth Bed, be blooded ſeveral Times, and obſerve an exact Regimen.



The

The Places that are benummed or paralitick, should have ſpirituous Fomentations apply'd to them, and be chafed with hot Linnen. When the Body is ſufficiently emptied, and the Pain is not conſiderable, vulnerary Potions may be given; on the contrary one muſt only give Anodyne and even Narcoticks if the Pain is acute. If the Patient is coſtive, he muſt take Clyſters, and if he does not make Water, he muſt be probed. Topical Medicines. Potions. Clyſters. Probing.

As for the Dreſſings the taking them off, muſt be deferred as long, and be done as ſeldom as poſſible, eſpecially if the Patient is quiet, and the Pains are not ſharp. One muſt obſerve what paſſes, to the End that one may find Remedies for any melancholly Accidents that may enſue; if the Pulſe beats high, one may bleed afreſh in the Arm, and if that does not ſucceed, in the Throat, ſince for any Diſorder in the Head 'tis uſual to bleed in the Foot, which alſo may be practiced in Luxations of the *Vertebræ*, provided one obſerve two Things; firſt, That the Veſſels are well empty'd by the Bleeding in the Arm, and 2dly, that the Patient may be let Blood in the Foot without moving him. Dreſſings. If a Fever follows. Obſervations.

If the Belly remains bound in Spite of the Clyſters, one may make them Cathartick; and if that don't ſucceed, one muſt purge, provided there is Blood enough taken from the Patient, and the Doſe is not violent. Obſervation.

If the Belly becomes ſtretched and painful, Fomentations, emollient Embrocations and Anodynes, are very uſeful, together with the general Remedies. Tenſion of the Belly.

If there be a *Gangrene*, one muſt deal with it apart, according to the different Degrees of Alteration. When the Alteration is ſlight, one makes Uſe of ſpirituous and ſaline Lotions, as Spirit

Spirit of Wine camphorated, and a Solution of *Sal Armoniack*, all laid on very hot, and often reiterated.

Stirax useful.

If some Places are of a red-like Purple, Ointment of *Stirax* may be added, after having wash'd the Part with the abovementioned Lotion.

Scarifying.

If the Spots are livid, one must scarify to the quick, foment with the before-mentioned Lotion, and apply Pledgets covered with a Digestive, made of *Basilicon*, and Ointment of *Storax*. One must cover the Part with a Cloath spread thick with *Storax*, and clap upon it thick Compresses, steeped in the Lotion very hot. The whole must be kept on with a proper Bandage.

Separations of the Escars.

If the Escars separate, one may help their Separation, by cutting the dead Flesh, and avoiding the Quick, for fear of causing Pain, and then the Medicines penetrate better.

Incisions and Cutting.

If in Spite of the Applications of these Medicines, the *Gangrene* gains Ground, one must come to Incisions, and even to cutting after a proper Manner, taking as much Care as is possible of the Parts necessary.

When the Luxation is well reduced, the gangrenous Disposition ought to cease on the Application of the first topical Remedies that I have prescribed, provided the Marrow or the Nerves have received no Contusion or Bruise, considerable enough to render the Topicks fruitless.

Observations.

If the *Gangrene* were more advanced, as happens when the Reduction has been made too late, a Cure may yet be hoped for; but when it comes after the Reduction is made, 'tis a forerunner of Death; whence one may judge that the displacing of the *Vertebræ* has produced such Disorders in the Marrow and Nerves, as are incurable.

The

The *Gangrene* is yet more fatal, when after the Suppreſſion there follows an involuntary Ejection of the Urine, and Excrements. This ſtagnated Matter heats and corrodes the gangrened Parts, and hinders the Operation of the Remedies.

Exhortations.

It remains, to end this Subject, that I exhort the Chirurgeons, who have ſuch melancholy Caſes under their Cure, to have Abundance of Temper, to keep their Patients in as proper a Poſition as they can, to viſit them often, in Order to prevent all their Wants, and hear their Complaints: For I dare venture to ſay, there are none greater Objects of Pity.

What muſt be remembred

Beſides, they muſt always have their Bed provided with an *Alaiſe*, or Half-Sheet, and an Oyl Cloath; both the one and the other keep the Bed dry, and the Skirt in particular ſerves to turn the Patient, and place him upon the Belly, for the more convenient dreſſing of him.

Obſervation.

If the Palſy don't ceaſe, tho' the Patient be cured of his Luxation, the Waters of *Bourbon* are very efficacious: Pumping is preſcribed upon the Parts that have ſuffered, and they are to be taken inwardly, obſerving the ſame Precautions, as thoſe who drink them after a Fit of an Apoplexy.

CHAP. V.

Of the LUXATION *of the Coccyx.*

Structure

THE *Coccyx* is the Extremity of the Spine, placed where the Tail is in four footed Animals, and has three or four *Vertebræ*. The firſt is jointed at its Body by, a Cartilage, with the

the End of the *Os Sacrum*: It has alſo two Sorts of oblique Proceſſes, which join it to the *Os Sacrum* by a Ligament. One may likewiſe obſerve in it two *Apophyſes tranſverſales*; the two other *Vertebræ* of the *Coccyx* have no Manner of Reſemblance to the *Vertebræ* of other Parts; they are jointed mutually between themſelves, and with the firſt by a Cartilage. Theſe Pieces together make a kind of Raven's Bill, convex without, and hollow and crooked within, in Order to ſuſtain the *Rectum*. It gives Adheſion to the *Sphincter Ani*, and ſome Part of the *Glutæi*.

The Word Luxation improper

What is commonly called the Luxation of the *Coccyx*, is not ſo, becauſe it's Junction is not an Articulation by Heads and Cavities, but an Union by Cartilage, which the Antients named *Synchondroſis*. However it be, 'tis very ſeldom that theſe *Vertebræ* are entirely disjointed; which makes me believe that one ought to call their Luxation outwards, Overturning; and the Luxation inwards, Depreſſion. If the *Coccyx* were entirely ſeparated from the *Os Sacrum*, it would be ſaid the *Coccyx* is broken, and not diſlocated. But leaving the Names, let us come to the Things, and ſpeak like the Vulgar.

Remark.

The *Coccyx* diſlocates inwards and outwards. The outward Luxation happens only after hard Labours, when the Infant has ſtuck long in the Birth; on this Occaſion the Cartilages and Ligaments that join the *Coccyx* loſe their Elaſticity, becauſe they are too long forced, and ſtretched by the Impulſion of the Infant, which is it ſelf continually thruſt by the Spring of the *Matrix*, the ſtrong Contraction of the *Diaphragm*, and the Muſcles of the *Abdomen*, whence the *Coccyx* at length not being able to reſiſt any more, is forced outwards; and can't return to its natural Poſi-

The Kinds.

Cauſe.

tion

ſition after the Delivery, becauſe the Cartilages and Ligaments have loſt their elaſtick Virtue.

Kind and Cauſe.

The *Coccyx* luxates inwards from contrary Cauſes, as Blows, Falls, *&c.*

Acci-dents of theſe Luxati-ons.

The Accidents which attend this Luxation are, a Heavineſs in the Fundament, and a conſiderable Pain, which is particularly felt when the Patient goes to Urine, moves his Thighs, goes to Stool, or coughs, ſpits, blows his Noſe, or ſneezes.

Explica-tion.

The Heavineſs proceeds from this, becauſe the *Coccyx*, whoſe Uſe is to ſuſtain the *Rectum*, finds its Weight greater than ordinary, by Reaſon its Ligaments are painful.

Explica-on.

The Pain which the Patient feels when he moves his Thighs, or goes to Stool, is cauſed by the *Glutæus Major* being faſtened to the lateral Parts of the *Coccyx*, and the Muſcles of the *Rectum* having Part of their Origin there likewiſe, whence it is always mov'd when the Muſcles act, either by the Motion of the Thighs, the *Rectum*, or the Bladder.

Progno-ſtick.

The Pain remains a long Time, nevertheleſs this Luxation is not dangerous, unleſs it happen to ſome cacochymick Subject, and the bad Qualities of the Humours cauſe Diſorders which the Luxation alone cannot produce.

Obſer-vation.

I once knew a Gentlewoman of 20 Years old, who fell upon the Ice, and got a very great Contuſion in her *Coccyx*: She neglected her Ail, Shamefacedneſs not ſuffering her to ſhew it till there was a Diſpoſition to gangrene. I bled her immediately, and relieved her ſo opportunely with Topicks, a *Regimen* and general Remedies, that ſhe got quit of it for a ſuperficial Impoſthume, which I opened, and of which ſhe was ſoon cured.

Obſervation. Another happened not to be ſo fortunate, ſhe had fallen upon a Corner Stone, which ſtruck the *Coccyx* near its Junction with the *Os Sacrum*. The ſame Baſhfulneſs which was prejudicial to the former, was much more ſo to this; her Pains indeed were not violent, but ſhe felt an uneaſy Weight in the *Rectum*, which became more conſiderable from Day to Day. She would not conſent to be touched until her Excrements could no longer paſs thro' the *Rectum*; having placed her upon the Bed-Side in the ſame Poſture as one who is to take a Gliſter, I introduced my Fore-Finger dipt in Oyl as high as I could into the *Anus*. I touched with great Difficulty a Tumour of the Bigneſs of a middling Pippin; and with my Fore-Finger of the other Hand, which I placed without near the End of the *Os Sacrum*, and the Beginning of the *Coccyx*, I diſcovered a Fluctuation, which anſwered from one Finger to the other as I moved them alternatively, which made me believe there was an Impoſthume: The Buſineſs was to open it (inſtead of preparing it, as ſome complaiſant Folks propoſed) having declared the Danger of deferring it. The Relations of the Patient were of my Mind, as ſhe her ſelf was alſo, the complaiſant Gentry were ſo likewiſe, and all out of Complaiſance..

I prepared Linnen Rags, a Compreſs and Bandage; then I put again my Fore-Finger into the *Anus* with the ſame Precaution, I even thruſt it in farther. I touched the Tumour a little better, and forcing it outwards as much as was poſſible, to bring the *Pus* near the Place where I had felt it, with the Fore-Finger of the other Hand, I plnged the Point of an Inciſion Knife directly to the Seat of the purulent Matter, which iſſued out in great Abundance;

and

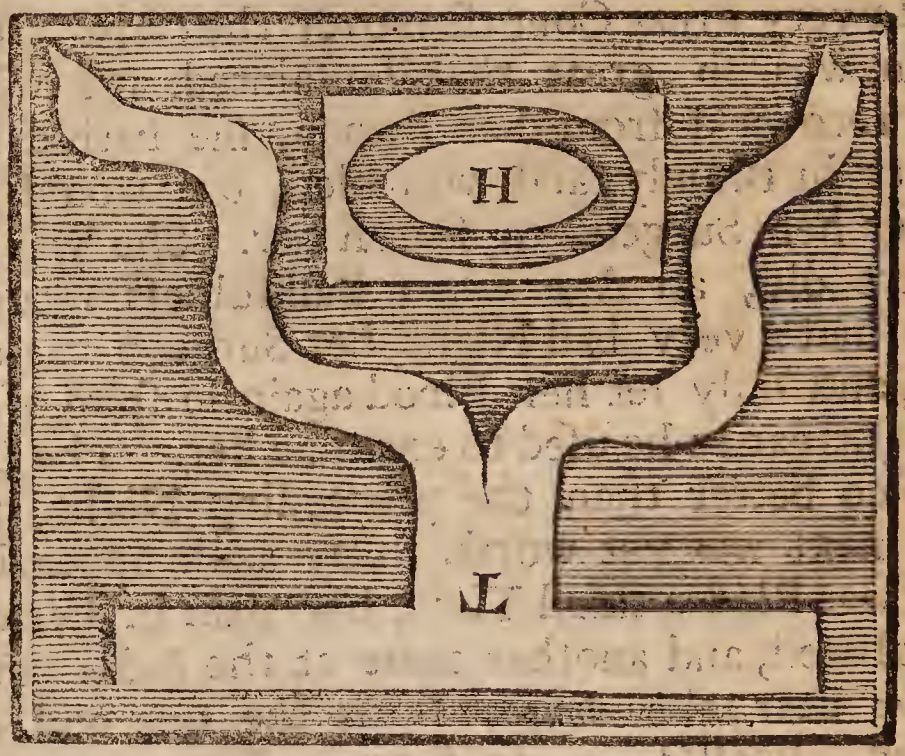
and the interiour ſwelling diſappeared. I put my Finger into the Wound, and I found the Point of the *Os Sacrum*, and the Head of the *Coccyx* entirely bare and ſtript of the *Periosteum*, as well as rotted by the *Pus*, which drowned us with its Quantity, and poiſoned us with its Stench. The Head of the *Coccyx* being entirely by it ſelf, was ſeparated and parted ſo as to give way for, and facilitate the Dreſſings which continued a long Time, and had not good Succeſs, the Patient died at the end of ſix Months, by the melting the Greaſe of the *Pelvis Renum*, by extraordinary Suppurations, which were attended with a ſlow Fever and a Looſeneſs till her Death.

A Lady by ſitting down hard upon the Frame of a Chair, inſtead of ſitting on the Cuſhion, had a very great Contuſion over the *Coccyx*. The Pain was ſo great that ſhe fainted, and when ſhe recover'd from her Swoon, ſhe bath'd her Hurt in Brandy, and was bled, but wou'd not ſuffer her Surgeon to ſearch her. She was 45 Years old, an Age when Baſhfulneſs returns. She had a very bad Night, her Surgeon was called, and only let her Blood again in ſpite of all the Intreaties he uſed to examine her. The Day was no better than the preceeding Night, and the next was yet worſe. Day again appearing, ſhe was Bled a third Time, her pain in her *Coccyx* abated, and another came at the *Labia* of the *Vulva* near the *Anus*. Both the one and the other, ſwell'd in ſo ſhort a Time, that in 24 Hours the Right Lip impoſthumated; the Impoſthume opened of it ſelf, and Fear determin'd the Patient to ſuffer the proper Openings; which done, ſhe was cured without any Inconvenience. Obſervation.

'Tis eaſily conceivable that if this Lady had ſuffered herſelf to be govern'd, more frequent Bleedings, and a Regular Management, might have prevented the Impoſthume.

All Luxations of the *Coccyx* are not Subject to like Accidents; I have cured a great many where not one has happened.

Reduction. To reduce the *Coccyx* when diſlocated outwards, one need only thruſt it inwards with ones Thumb, and keep it in its right poſition with the graduated Compreſſes (H) and a Bandage (T) which muſt be placed in ſuch a manner that the Patient may go to Stool and Urine without taking off the Dreſſing.



Spirituous

Spirituous Medicines are very proper: I likewiſe uſe on this Occaſion a Defenſive, the Method of preparing whereof I will lay down as it was taught me by the Inventor of it. 'Twas the late Mr. *Martial* who was Surgeon Major of *Tournay*, in the War concluded at *Reswick*. Medicines.

Brandy wherein a little Allum has been diſſolved, with Spirit of Wine camphorated, and a great many other Remedies, may be made uſe of, not only in this Luxation, but all others. I am no admirer of Oyl; I have obſerved ſo often that it cauſes Itching, and an *Eryſipelas*, that I have left it off in all Dreſſings of Fractures and Luxations. Remedies.

To reduce the *Coccyx* when luxated inwards, one muſt dip one's Forefinger in Oyl of Olives, or of Sweet Almonds, and introduce it into the *Anus* as far as is neceſſary to get beyond the end of the *Coccyx*, in order to raiſe it. The ſame Remedies are applyed; but one makes only a looſe Bandage purely Contentive to keep them upon the *Coccyx*. Reduction of the Coccyx inwards.

The Patient muſt keep his Bed lying upon a Roller or Pad, during the whole Cure; or if he riſes, he muſt ſit down upon a perforated Chair that nothing may preſs upon the Part; which would cauſe new pains, and perhaps a Diſlocation.

CHAP. VI.

Of the Luxation of the Clavicula.

Uſe of the Clavicle.

THE *Clavicula* is that Bone which, like a ſort of a Buttreſs, keeps the *Omoplata*, and the *Humerus* at a diſtance from the Breaſt, both to hinder the Weight of theſe Parts from ſtraitening the Breaſt in its Dilatation, and to give Liberty to the Arm to exerciſe all its Motions. This Bone is articulated with the *Sternum* and the *Acromion*.

Structure.

To join it ſelf with the *Acromion*, it has a Head a little raiſed, covered with a ſmooth Cartilage, which is received in a Cavity proportionable to the largeneſs of the Head, which is hollowed in the internal Side of the End of the *Acromion*. It is as it were the little Head covered with a Cartilage ſmooth and poliſh'd: The whole is overcaſt, wrapt up, bound and faſtened by ſtrong and compact Ligaments, inſomuch that by this Articulation the Clavicle has but little motion. The *Deltoides* and *Trapezius* are faſten'd to the *Clavicula* and the *Acromion* at the place of their Junction.

In its Articulation with the *Sternum* it forms a pretty large Head, covered with a ſmooth Cartilage. The *Sternum* has a Cavity whoſe Size is not anſwerable to the largeneſs of the Head. neither the one nor the other have a regular Roundneſs, nevertheleſs they are joined to a Median Cartilage that is found in the Articulation, like that which we have obſerv'd in the jointing of the under Jaw. The whole is faſtened and covered over with Ligaments that are pretty ſtrong, but looſe, and give the *Clavicle* great

great Liberty in moving; and it does move, whenever the *Omoplata* either moves alone, or with the *Humerus*.

The *Muſculus Sternoclinomaſtoides* takes its beginning from the *Sternum* of the *Clavicle* at the place of this Junction. The Pectoral is faſtened to the internal half, and the *Deltoides* to the external half, of the *Clavicle*, and the Veſſels that go to the Arm paſs behind it.

Both the Articulations of the *Clavicle* may diſlocate. The moſt eaſy Luxation is that of the Articulation of the *Sternum*, becauſe it is more moveable than the other, and that its Head is larger than the Cavity that receives it. Falls and Blows upon the Shoulder always thruſt the *Cavicle* towards the Side of the *Sternum*, and 'tis this Articulation which ſuffers the moſt.

It diſlocates either backwards or forwards. When 'tis thruſt backwards, the *Clavicle* approaches the *Aſpera Arteria*. When it is luxated forwards, it breaks out of its Socket, and goes beyond the *Sternum*. The Kinds.

The firſt happens but ſeldom; the ſecond is more eaſy, becauſe the *Clavicle* inclines to that Side by its natural Situation; ſince that end of it which is faſtened to the *Omoplata* is removed farther backwards, than that which is joined to the *Sternum*.

Of the Cauſe.

The Cauſes both of the one and t'other of theſe Luxations, are Blows and Falls, which are capable of thruſting the *Clavicle* againſt the *Sternum*, and oblige it to leave its Socket, and throw it ſelf backwards, if the Shoulder be forwards; or forwards if the *Humerus* be in its natural Situation.

Of the Signs.

Signs. It is eaſy to know theſe Luxations; the firſt becauſe of the ſinking in that is obſerved at the Place whence the *Clavicle* is come; and the Second, by the prominence that is ſeen outwards.

Prognoſtick.

Prognoſtick. The Accidents in a compleat Luxation backwards are very melancholly, becauſe the *Clavicle* Compreſſes the *Aſpera Arteria*, the *Oeſophagus*, the Jugular Vein, the *Carotides*, and the Veſſels adjacent; which renders this Luxation more difficult than the other.

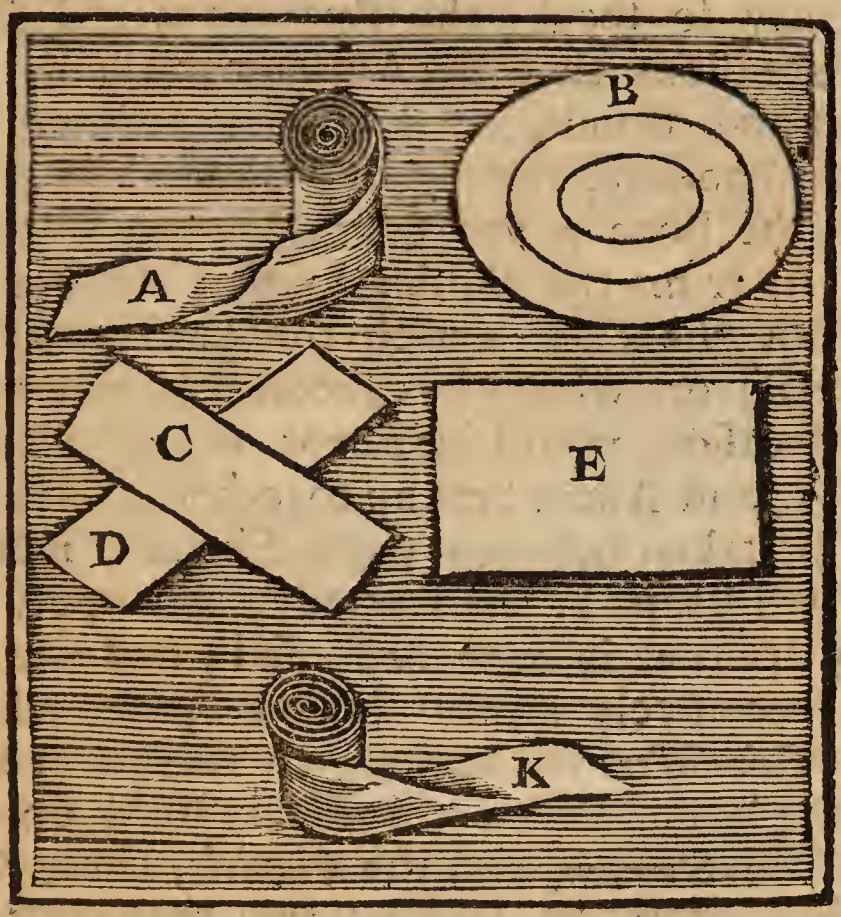
Of the Cure.

Reduction. 'Tis eaſier to reduce the *Clavicle*, than to keep it in. To reduce it, the Patient muſt be plac'd upon a Stool, one ſingle Aſſiſtant makes the Extenſion and Counter Extenſion, by leaning one of his Knees on the two *Omoplatæ*, and at the ſame time drawing to him the Stump of the *Humerus* with both his Hands. Whilſt the Extenſion is making, the Surgeon examines the Progreſs, and when he thinks it ſufficient he makes the Reduction (his Aſſiſtant ſtill continuing to do his Part) by drawing the Clavicle forwards with his Fingers, when the Luxation is backwards, and thruſting it backwards when the Diſlocation is before.

Remarks. This is the only Luxation, proceeding from an external Cauſe, that has much need of a Bandage to keep it in its right poſition; becauſe the Head of the *Clavicle* is larger than the Cavity of the *Sternum*, which beſides has no

Ledge

Ledge to retain it. Moreover the Ligaments are either forced or broken, and there is no Muſcle that can reſtrain it.

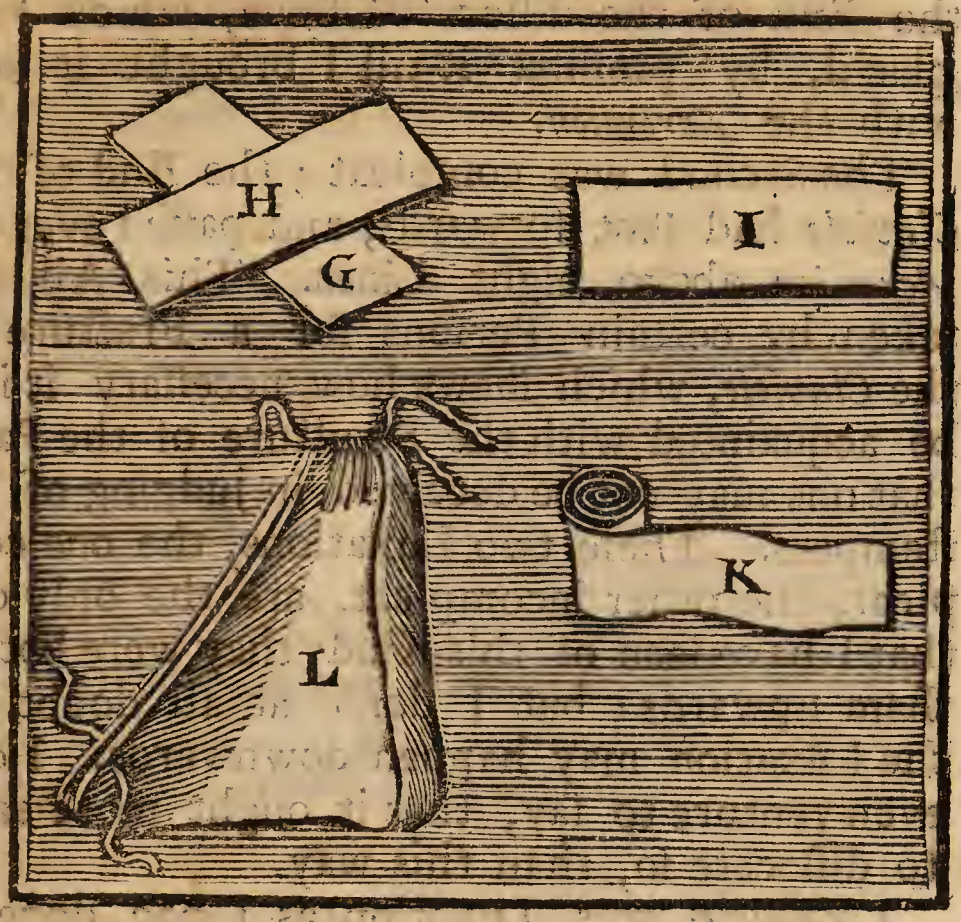


In

In the Luxation backwards, the Roller (A) muſt form a Figure of eight, which draws the Shoulders backwards, and makes the internal end of the *Clavicle* advance forwards. This Bandage muſt have but 3 or 4 Circumvolutions, and muſt be made in ſuch a manner that the diſordered Part be left uncovered. It continues (if I may ſo ſpeak) the Extenſions and Counter Extenſions that the Aſſiſtant made with his Knees and Hands. Whil'ſt the Aſſiſtant puts on this Bandage, the Surgeon directs it, and preſerves the Bone he has reduc'd, in its Situation; then he trims the ſinking in that is behind the Head of the *Clavicle* with the graduated Compreſs (B) or, which has ſucceeded with me on this Occaſion, with Lint ſteept in the White of an Egg, and Allum beat up together. This Lint is to be taken between one's Fingers, more or leſs, and ſteept in the Remedy, and apply'd to the place that is moſt depreſſed; and one muſt trim ſucceſſively all that hollow Space, which is called *Salt-Sellers* in Deriſion, to ridicule Perſons that are lean. When this Pit is fill'd up even with the *Sternum*, and the *Clavicle*, three Compreſſes, muſt be laid on two that croſs each other as (C) (D) and one (E) which covers them both. Over theſe Compreſſes muſt be made the Bandage *Spica*, with the Roller (K) the Croſſings and Truſſes of which are paſſed over the affected Part, to keep it in its Place.

Application of the Dreſſing.

In



In the other kind, one puts upon the Articulation very thick Compreſſes (G) (I) They muſt be kept in this Situation by the deſcending Bandage *Spica*. Both in the one and the other kind, the Arm ought to be ſupported by the Scarf (L). The Roller (K) ought to be four Fingers broad, and four or five Ells long

The LUXATION *of the external End of of the Clavicle.*

I never ſaw the Luxation but twice; the firſt was incompleat; the End of the *Clavicle* had ſally'd but a little from the *Acromion*. It was eaſily reduc'd by making the Extenſion, as has been

First Obſervation.

been directed, and leaning the Thumb upon the End of the dislocated Bone, which I replac'd, by pressing it till I brought it even with the *Acromion*.

Second Observation.

The Second was compleat; the End of the *Clavicle* had shot forwards, and passed over the *Acromion* above eight Lines. This Ail was taken by certain Persons for a Fracture of the *Clavicle*, which shews how necessary it is to be acquainted with the Structure of the Parts, that one may not be deceived in judging of Distempers. These two Luxations, the one compleat, the other incompleat, are the only ones that I have seen of this Kind; they were both of them upwards; but I don't at all doubt but the Luxation may happen downwards. I dare even venture to say, that it ought more easily to dislocate so, than this way.

Reduction.

I reduc'd this Luxation as I had done the former, by rendering the Extensions stronger, and leaning my Thumb with more force upon the End that was raised; because the disjointing being more considerable, it requir'd more powerful Efforts.

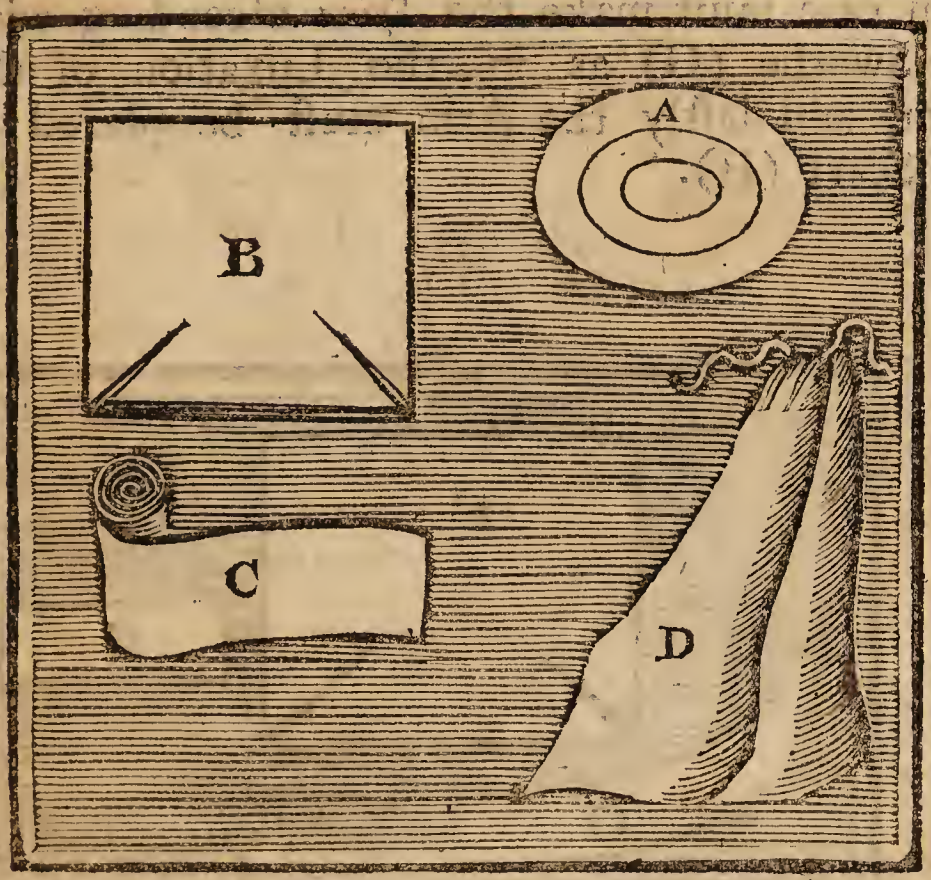
Another Reduction.

If the *Clavicle* were luxated, beneath the *Acromion*, the same Extensions shou'd be used, the Head of the *Acromion* should be thrust downwards, and the End of the *Clavicle* rais'd.

When the *Clavicle* dislocates at the End of the *Acromion*, the Dressing must be a gradua-

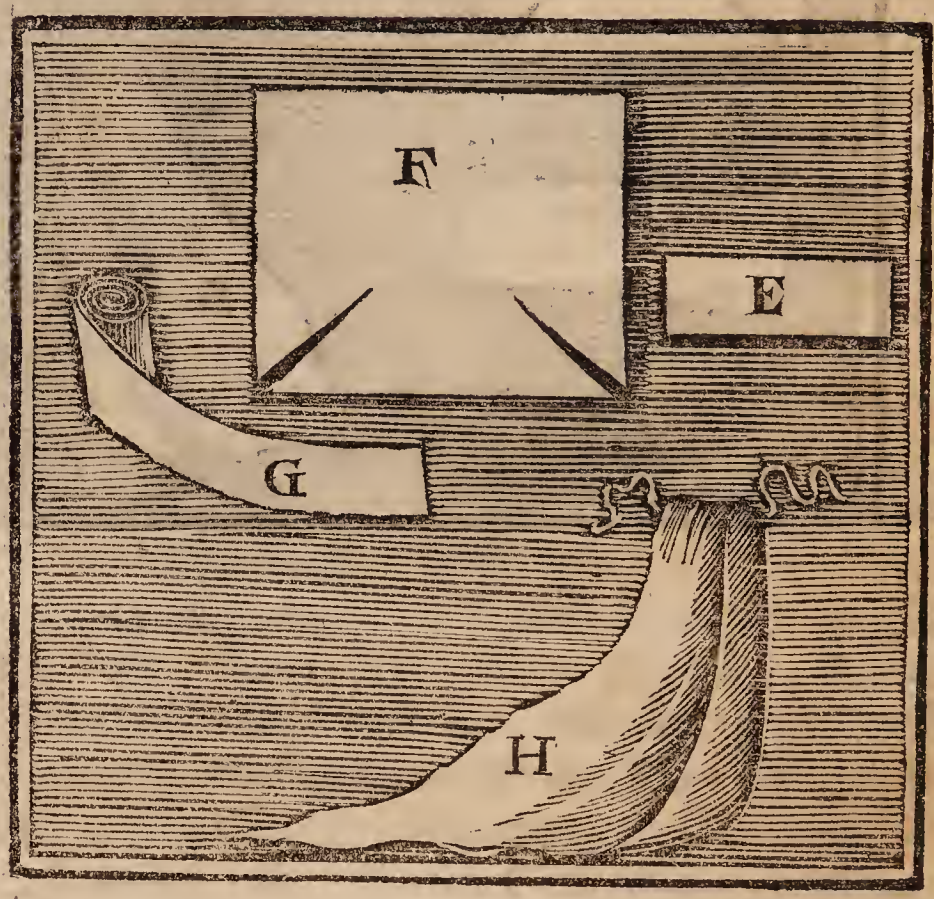
ted

ted Compreſs (A) and upon the *Clavicle*, another Compreſs (B) which covers the ſtump of the *Humerus*, a Roller (C) the *Spica* deſcending, and the Scarf (D).



As

As for that which luxates underneath the *Acromion*, the Reduction being made, a thick Compreſs (E) muſt be clapt under the End of the *Clavicle*, and one of the ſame thickneſs (F) upon the *Acromion*, a third (I) muſt fold over the two firſt, and the ſtump ofthe *Humerus*; then one muſt make the *Spica* aſcending with the Swathe (G) as in the Luxation of the Arm, and laſtly the Arm muſt be placed in the Scarf (H).



CHAP.

CHAP. VII.

Of the LUXATION *of the Arm.*

THE Bone of the *Humerus* is articulated with the *Omoplata* by a *Poples* or *Genou*. This Bone has a large Head, and the Cavity of the *Omplata* is ſo ſhallow that it don't contain the ſixth part of it. It only ſerves as (one may ſay) for a *Fulcram* whereon only one point of the Head bears, which abates the friction, and facilitates the Motion of the Arm. The reſt of the Head is lodged under the *Acromion*, which together with the End of the *Clavicle*, forms a place of Refuge, where the Head of the *Humerus* and its Articulation are ſecured from external Injurys. Structure.

The *Proceſſus Coracoides* is of ſome Uſe in the Conſtruction of this place of Refuge, or ſecond Socket; It limits it on the internal ſide and there is a ſtrong Ligament, which goes from the Extremity of this Proceſs to inſert itſelf with the *Acromion*, and the *Clavicle* at the place of their Junction. Apophyſes.

A Ligamentous Tunicle, which folds round the Articulation, retains the *Synovia* which bathes it. Tunicle of the Joint.

The Extent of this Tunicle, renders the Motions of the Head of the *Humerus* free and eaſy, and the other Ligaments being alſo very looſe in Proportion, give the Arm a wonderful facility in moving with quickneſs, and all manner of Ways. Its Extent.

This is the Articulation whoſe Motions are moſt combin'd. The Arm is raiſed by the Muſcles *Deltoides*, and *Supra-Spinatus*; it is drawn downwards by the *Rotundus Major* andthe *Latiſſimus*; Motions of the Arm.

tissimus; it is carried forwards by the *Pectoral* and the *Coracobrachialis*; and is drawn backwards by the *Infra Spinatus* and *Sub-scapularis*.

Motions of the Arm.

Besides all these Motions it has a Million more, by the Conjunction of the Muscles; for it can move in all the Lines that can be drawn from the Centre of the Cavity of the *Omoplata* to the Circumference; and besides it has a round and Semi-circular Motion.

Tonick Motions.

The Motion round ways, is made by the Succession of the Muscles which assist in the four former Motions whereof I have been speaking, and which, when they all act together, keep the Arm stiff and firm any way whatsoever, which is what is call'd the Tonick Motion.

Semicircular.

The Semi-circular Motion is, when the Arm is extended and raised. Then the *Deltoides* and *Supra Spinatus* sustaining it in this Situation, the *Sub-scapularis* make it turn from without inwards, and the *Rotundus Major*, with the *Infra-Spinatus*, turn it from within outwards.

Muscles that pass by the Articulation.

Besides all these Muscles just named, there are two more which pass by the Articulation, *viz.* the long *Extensor* of the Fore-Arm, which takes its rise from the Neck of the *Omoplata*, and the two Heads of the *Biceps*, one of which is lodged in a particular Sinuosity in the fore Part of the Neck of the *Humerus*. It takes its Origin from the upper Part of the Cavity of the *Omoplata*, the other comes from the *Processus Coracoides*.

The Blood Vessels, the Lymphatick Ducts, and the Nerves pass under the hollow of the Arm. This Cavity is fill'd with much Fat, and some conglobated Glands. It is formed,

by

by the Diſtance of the *Pectoral* Muſcles, the *Latiſſimus*, *Rotundus*, and *Serratus Major*.

Here is a general Idea, of the Articulation of the *Humerus*, which is ſufficient for the underſtanding, what I ſhall now ſay of its Luxation.

The *Humerus* uſually diſlocates under the Arm-pit: it alſo luxates ſometimes before, under the great *Pectoral*, directly downwards on the nether Rib of the *Omoplata*, and outwards under its Spine, but it cannot ever be disjointed directly upwards, unleſs the *Acromion* and the *Clavicle* be fractur'd. The Kinds.

It cannot be luxated directly upwards, becauſe the Muſcles *Deltoides*, the external Head of the *Biceps*, the *Proceſſus Acromion* and the *Clavicle* oppoſe this Luxation. It cannot luxate.

It is hard for the Head of the *Humerus* to diſlocate directly downwards, as well becauſe the *Extenſor longus* of the Fore-Arm withſtands it, as becauſe it it is very difficult for the Head of the Bone to remain on the nether Rib of the *Omoplata*; nevertheleſs that Luxation has been ſeen. There are two Ways that are more eaſy; to wit, outwards and inwards. Difficulty of its Luxation.

When the Bone diſlocates externally, it lodges under the Spine of the *Omoplata* at the Root of the *Acromion*. This Luxation happens more ſeldom than the other, becauſe the Muſcles *Rotundus Minor*, and *Infra Spinatus*, have leſs Force to draw the Bone outwards, than the *Subſcapularis*, the *Latiſſimus* and great *Pectoral* have, to draw it inwards. This depends ſtill more upon the Situation of the Elbow, at the Time of the Falls as has been ſaid elſewhere. The place where it lodges.

When the Head of the Bone ſlips inwards it may lodge it ſelf in two Places, *viz.* under the *Pectoral* between the *Apophyſes Coracoides*,

and the *Clavicle*, which cannot happen but with Difficulty; or elſe under the Arm-pit, where there is a large Cavity, or to ſpeak more properly, a Space that is only fill'd with Fat Membranes, Glands and Veſſels, that eaſily give Place to the Head of the *Humerus*.

Remark. 'Tis proper likwiſe to remark, that the *Humerus* never diſlocates but when 'tis at a Diſtance from the Breaſt, which always happens when one makes any Offer to ſave one's ſelf in a Fall. Then, if the Fall be violent enough, and the Elbow comes to the Ground, the Head of the Arm, will be forc'd inwards, and the Luxation will be forwards under the *Pectoral*. If the Elbow is turned outwards, and a little raiſed, it will luxate downwards; and outwards, if the Elbow is turned inwards.

How the Bone luxates

Remark. The Arm muſt be conſiderably raiſed when it diſlocates directly downwards, under the nether Rib of the *Omoplata*; but the Head of the *Humerus* can't reſt long upon this Rib, becauſe it is round, and the Breadth of this Rib is very ſmall; therefore it will ſally either inwards or outwards, but more eaſily inwards, for the Reaſon above-mentioned. This will happen every Time the Patient, or the Aſſiſtants who raiſe him, move the Arm without Precaution, for they will alter the Situation of the Head. It may even happen by unadviſed Motions, made with a Deſign either to diſcover the Luxation, or reduce it.

Of the Cauſes.

Cauſes. As to the Cauſes, Recourſe muſt be had to the general Account. I ſhall only ſay that the *Humerus* diſlocates with more Eaſe than any of the other Bones, becauſe the Arm is the

Part

Part which firſt preſents to ſave the Body, in Falls; and as 'tis that we make Uſe of to Defend our ſelves, it is the moſt expoſed to Strains and Falls.

The Cavity of the *Omoplata* is ſhallow, having no Fence but in the upper Part, where 'tis impoſſible it ſhould luxate; it is ſo flat that it is not capable of retaining the Head of the Bone. Remark.

The Articulation of the *Humerus* is by a *Genou*, and as its Head reſts (as one may ſay) only upon one Point, 'tis eaſy to conceive that a middling Blow will make it break from its Axis, with leſs Difficulty, than the *Genou* of the Thigh, which has a deep Socket, and even with more Eaſe than any *Ginglymus*, which has always ſeveral Heads and divers Cavities, great Part of which mutually touch each other; beſides that the Ligaments of the Arm are very looſe, that 'tis not confined by a round Ligament like the Thigh, and that all its Motions are quick. Theſe are the Reaſons why the Bone of the Arm diſlocates with more Eaſe than the others. Remark.

Signs that the Humerus is luxated downwards.

The Signs that the *Humerus* is luxated directly downwards on the nether Rib of the *Omoplata* are, that the Arm becomes longer, the Fore-Arm is ſtretched, the whole Arm is a little raiſed; the Patient is in Pain when one bends his Arm down, and finds Eaſe when it is a little raiſed. It puts him to Torment when one bends the *Cubitus*, and he is relieved upon ſtretching it out. Signs.

The *Humerus* is longer, becauſe the Head of the Bone is under the Cavity of the *Omoplata*. First Explication.

Second. The *Cubitus* is ſtretched, becauſe the Head of the Arm thruſts the *Extenſor Longas* backwards.

Third. The *Humerus* is a little raiſed, becauſe the Muſcles *Deltoides* and *Supra-Spinatus* are ſtretched, being moſt at a Diſtance from their Origin.

Fourth. The Patient is in Pain when his Arm is bent, becauſe one ſtretches the *Deltoides* and *Supra-Spinatus*, which are already too much extended by the Removal of the Head of the Bone; and he finds Relief when one raiſes the Arm, becauſe one abates the Extenſion of thoſe two Muſcles.

Fifth. It cauſes Anguiſh, when one bends the Fore-Arm, becauſe it ſtretches the *Extenſor Longus*, which is already too much ſtraitened: And it eaſes the Patient when one extends the *Cubitus* for a contrary Reaſon.

Sixth. The Pain is felt from the Elbow to the *Omoplata*, becauſe that is the Extent of the long Muſcle.

Signs of an outward Luxation.

Signs and Explication. The Signs that the Luxation is outwards, are, that the *Humerus* is brought near the Breaſt, becauſe the Muſcle *Coracoideus* and the *Pectoral* are extended. The Patient ſuffers when one removes the Arm from the Breaſt, becauſe one forces the *Pectoral* and *Coracoidius*. Sometimes the Arm is longer, and ſeldom ſhorter. The more it is removed from the Cavity *Glenoides* of the *Omoplata*, the longer 'tis; and the leſs 'tis removed, the ſhorter.

Signs

Signs that the Arm is luxated under the Arm-Pit.

When the *Humerus* is diſlocated inwards under the Arm-pit, one finds a Cavity under the *Acromion*, and this Part of the *Omoplata* ſeems more prominent. Signs.

There is a Tumour under the *Axilla*, the *Humerus* is a little raiſed, and at a Diſtance from the Body; the Elbow is a little bent, and can't ſtretch but with Pain: The Patient ſuffers very much when one brings the Arm near the Breaſt. Sometimes the *Humerus* is longer then uſual, but often ſhorter. Sequel.

The Cavity that is obſerved under the *Acromion*, is that where the Bone of the Arm was before its Luxation, which makes that Prominence of the *Omoplata* appear more than it ought. Firſt Explication.

The Tumour that is under the *Axilla*, is cauſed by the Head of the Bone which is lodged there. Second.

If the *Humerus* is a little raiſed, 'tis becauſe the *Deltoides* and the *Supra-Spinatus* are ſtretched; and if 'is removed from the Breaſt, that proceeds from the Contraction of the Muſcles which draw the Arm outwards. Third.

The Elbow keeps bent, becauſe the two Heads of the *Biceps*, which come from the *Omoplata*, are diſtant from the Place of their Inſertion. Fourth.

The *Cubitus* is in Pain when ſtretched, and the Patient finds Relief when 'tis bent, becauſe that in the one the *Biceps* is extended, and in the other Motion 'tis put in a more natural Poſition. Fifth.

The *Humerus* is generally longer than uſual, ſometimes 'tis of an equal Length, and at Sixth.

other Times much ſhorter than the ſound one. If 'tis of equal Length, or longer, 'tis a Sign that the Head of the Bone is not raiſed higher than the Cavity of the *Omoplata*, and then all the Signs that we have juſt given will meet there. But if the Arm be ſhorter, from its having been forced under the hollow of the Arm-Pit, the *Cubitus* does not change its Figure, it is even indifferent either in Flexion or Extenſion, becauſe the *Muſculi Flexores & Extenſores* are equally diſtant from their *Fulcrum*.

Obſervation.

Signs that the Humerus is luxated forwards.

Signs.

When the Head of the *Humerus* has ſallied forwards, it is lodged under the great *Pectoral* and *Serratus Major*, in the Space that is between the *Apophyſis Coracoides*, and the *Clavicle*.

The Arm is not much ſhorter.

The *Cubitus* is a little bent.

The Elbow is at a greater Diſtance from the Breaſt, than in the Luxation downwards.

The Arm is leſs raiſed.

There is a Tumour under the *Pectoral*, between the *Apophyſis Coracoides* and the *Clavicle*.

This *Apophyſis* is defaced, that is to ſay, can't be perceived by the Touch even in ſuch as are lean. The Cavity under the *Acromion* is leſs perceptible than in the Luxation downwards, and the *Acromion* does not jut ſo much out.

The Patient is put in Pain when his Elbow is brought near his Breaſt, and is relieved when one removes it a little.

First Explication.

The *Humerus* is not much ſhorter than in its natural State, becauſe the Space between the *Proceſſus Coracoides*, and the *Clavicle*, is but a Finger's Breadth more raiſed than the Cavity *Glenoides*.

The

The *Cubitus* is but a little bent, becauſe the Arm not being conſiderably removed, the Head of the *Biceps* is but a little ſhortened in Proportion. Second.

The Elbow is more diſtant from the Breaſt, becauſe the external Part of the *Deltoides* being ſtretched, draws the Arm outwards. Third.

The Arm is leſs raiſed, becauſe the Head of the Bone which is over it, keeps it from the Touch. Fourth.

The Cavity under the *Acromion* is not ſo perceivable as in the Luxations downwards, becauſe the Head of the *Humerus* makes a great Sally, and ſuſtains the *Deltoides* almoſt in its uſual Roundneſs, and from the ſame Reaſon the *Acromion* does not jut ſo much outwards. Fifth.

The Patient is put in Pain when his Elbow is brought near the Breaſt, becauſe the external Part of the *Deltoides* being extended, cannot be aſſiſtant in ſtretching it ſelf out; and he is relieved when one removes it at a Diſtance, for the contrary Reaſon. Sixth.

Prognoſtick.

Firſt, this Luxation, which is one of the eaſieſt that happens, is alſo one of the leaſt dangerous. Prognoſtick.

An incompleat Diſlocation of the *Humerus* would be yet leſs troubleſome; it is reduced with a great deal of Eaſe. 'Tis this, without doubt, that certain Bone-Setters, and other Gentry, who ſing their own Praiſes, pretend to have reduced without Help, only with the Turn of a Hand. To hear them one would think the Bones obeyed their Touch, and that not one made the leaſt Difficulty of re-entring its

its Place, as ſoon as they clap their magical Hands upon it.

'Tis difficult to ſucceed when the Bone is before under the *Pectoral* Muſcle.

That which is outwards is reduced with a great deal of Eaſe.

That which is directly downwards is the moſt eaſy to ſet, provided 'tis ſoon diſcovered, and one makes no Motion that may incline the Head of the Bone to ſally outwards or inwards, which would render the Luxation more troubleſome to reduce.

Remark. When the Head of the *Humerus* is luxated under the Arm-Pit, the Reduction is eaſy, if the Arm be either longer, or as long as it is naturally.

If the Arm is ſhorter, it is more difficult; inſomuch that when the Head of the *Humerus* is ſunk into the Hollow of the *Axilla*, one meets with a great deal of Trouble in making the Reduction.

It is very dangerous when the Head of the Bone is ſunk ſo far in, that the Blood and Lymphatick Veſſels and Nerves are compreſſed, becauſe Numbneſs, Swellings and Defluxions will follow.

Remark. When Perſons are Fat, the Reduction with Straps is difficult, becauſe the Thickneſs of the Fat hinders the Straps from taking Hold of the Bone near enough, which makes them ſlip, and renders them unſerviceable.

Remark. When Perſons are very fleſhy, the Reduction is hard to be made, by Reaſon of the Force and Reſiſtance of the Muſcles.

One may prognoſticate from many other Things, but they who have Need of it may find in the General Prognoſtick whatever is wanting in the Particular.

Of

Of the Cure of the Luxation of the Arm.

To reduce the Bone of the Arm in whatever Place its Head is lodged, the Patient muſt be ſet upon a low Chair, to the End that the Part which is affected, may be ready to make the Extenſion and Counter-Extenſion. Cure of the Luxation.

There are ſeveral Ways of performing theſe two Operations; but I will only examine and deſcribe ſuch as have been moſt in Uſe, ſhewing the Advantages and Defects of each in particular. Many Methods.

Firſt Method.

The Extenſion and Counter-Extenſion are made with the Hands, by drawing the Arm above the two Condyles of the *Humerus*, whilſt the Body is with-held or drawn, that it may not follow thoſe who pull the Arm; for otherwiſe it would be impoſſible to make a proper Extenſion. The Surgeon, being placed on the Outſide of the Arm, muſt have a Napkin tied about his Neck, wherein the Arm of the Patient muſt be put above the middle, then he muſt lay his two Hands upon the Upper Part of the Arm near the Shoulder, to the End that obſerving attentively the Degree of the Extenſion, he may conduct the Head of the Bone into its Socket, with his Hands, and the Napkin, which he raiſes up with his Neck, as ſoon as the Extenſion is ſufficient. First Method. Manual Operation of the Surgeon.

This Method is one of the beſt that is, and there is nothing in it contrary to Rule, but the Force, which is not always ſufficient, unleſs it be in young Perſons, or in any other Subject that is weak and infirm.

Second Method,

There are ſome who keeping the Body fixed to ſome Place, paſs the Arm between their Legs, and have it drawn by ſome ſtrong Perſon; then when it is ſufficiently extended, they take hold of the Upper Part of the Arm near the *Axilla*, to raiſe it and put it in its right Place.

Defect. This Method has the Defect of the other, joined to one that is much greater; which is, that the Arm being bowed down to paſs it between the Legs, the Muſcles *Levatores* are too much ſtretched, and according to what we have ſaid in General, they ought to be a little relaxed, as ſhall be more amply demonſtrated in the Sequel.

Third Method.

The Ladder and the Door have been made Uſe of, and are ſtill. In theſe two Methods 'tis not always Strength that is wanting, but a proper Situation of the Part.

When they would reduce the Arm with the round of a Ladder, or the Tops of a Door, they cover it with a Cloth folded in twelve or fifteen Doubles, they let the Ends of the Cloth hang down on both Sides, and make the Patient get upon a Chair or Stool of a Height convenient, that his Arm may be even with the Door, or Step of the Ladder that is trimmed with the Cloth. Then the Surgeon mounts upon ſomething that is firm and higher than the Stool whereon the Patient ſtands, that he may be in Readineſs to make good Uſe of his Hands. He paſſes the diſlocated Arm

over

over the Door or Ladder, he has it held ſteady by two or three Perſons, who draw it, and bring it near the Door, then he puts his Hands upon the Part affected to obſerve attentively what paſſes. He removes the Stool from the Patient's Feet, and the Body being abandon'd, to its own Weight makes the Counter Extenſion, whilſt they who draw the Arm on the other Side the Door make the Extenſion. They who follow this Method ſay the Reduction is made when the Arm, the Door, and the Body are in three parallel Lines, which ſhall be prov'd to be falſe.

This Method is very antient, one may ſay that 'tis deriv'd from the *Greeks*. If they who follow it are ignorant of its Defects, I am going to demonſtrate them, and I hope to baniſh from their Chirurgical Arſenal theſe Inſtruments, which create as much Horrour as they are Pernicious. Pernicious Ways.

To ſhew in what the Door and Ladder are pernicious, it muſt be obſerved that there may be too much, or too little Strength; that one is not Maſter of it to give it a due Proportion, and that if it happens to be ſo, 'tis pure good Fortune. In Effect, if a lean Man has a Luxation where the Head of the Bone is lodged in the inmoſt Part of the Arm-pit, the weight of the Body, which in this Method is the Principal Cauſe that acts; would not be ſufficient, and the Extenſion would be imperfect.

If on the contrary, a fat Man has a Luxation where the Head of the *Humerus* is not quite ſunk into the Cavity of the Arm-pit the Weight of his Body will have a force infinitely Superiour to the Reſiſtance of the Muſcles; and that which is more than ſufficent for reducing the Luxation will cauſe fatal and perhaps incurable

Diſorders

Diſorders, as a Rupture of the Muſcles, Tendons and Ligaments.

Obſervation. After Reductions made by the Ladder or Door, there have been obſerved profound Contuſions on the Ribs, under the *Axilla*, and in the inſide of the Arm along the Veſſels, which have been followed by very fatal Impoſthumes. I have ſeen in the like caſe the Trunk of the Brachial Artery opened, which inſtantly cauſed a very great Aneuriſmal Tumour, whereof the Patient dyed. It took up the inward Part of the Arm, the Cavity of the *Axilla*, and the Bottom of the *Pectoral* Muſcle. Another Time I ſaw the Bone of the Arm broken near its Neck by the Efforts of ſome who try'd to make the Reduction with the Ladder.

Accidents that happen. This Method is always fatal when one does not ſucceed, and it often happens even when the Bone is reduced, that after theſe Strains, the Joint becomes inflamed or paralitick; or that an *Anchiloſis*, *a Purulent Defluction*, *Oedema*, *Dropſey in the Articulation*, and many other pernicious Symptoms enſue. I have often known the Limbs deprived thereby of their Strength and Motions, which the taking the hot Mineral Waters for ſeveral Seaſons had not cured without great Difficulty. I have ſeen the Bone diſjoint of it ſelf in a little Time after reducing of Luxations by this Method; and the Patient could not be cured without a great deal of Trouble, by all the Remedies and Means laid down in the Cure of Luxations in general.

Fourth Method.

There are ſome who make the Reduction with their Heel, laying the Patient at his length upon the Ground, pulling off their Shoes and laying

laying themſelves by his Side with their Feet to his Head. If they are to reduce the left Arm, they place the Sole of their left Foot under the Arm-pit, and taking hold of the Fore-arm above the Wriſt, they puſh with their Feet while they draw the Arm with Force, by which they make the Extenſion, and Counter-extenſion, and the Bone is ſometimes reduced.

This Method has two Faults; the firſt is that the Situation, proper to the Muſcles, that raiſe the Arm, is not obſerved. The Second is, that the Fore-arm, is pull'd, and I have prov'd before in the general Account of Luxations, that the Extenſions ſhould be made by pulling that very Bone which is diſlocated.

Fifth Method.

Being at the Army, a Surgeon Major, ſeeing me reduce an Arm, told me, that he had ſeveral Times had Succeſs in ſeating the the Patient upon a Chair, and himſelf upon another of equal Height beſides him, with his Face towards his Patient. That if 'twas the left Arm, he put the Palm of his left Hand under the Arm-pit as far as he could, as if he would feel the Articulation; that he afterwards leaned his Elbow upon the Patient's Thigh, and with his Right Hand took hold of the lower Part of his Arm; then bending it down with a ſudden Jerk, whilſt his Right Arm leaning upon the Patient's Thigh, ſerv'd as a Buttreſs againſt the *Axilla*, he made it turn upſide down and reduc'd it.

This Method has the Defect of *Hipocrates*'s *Ambi*, and none of its Perfections.

Sixth

Sixth Method.

The Ambi of *Hipocrates*

The Inſtrument call'd *Ambi* was invented by *Hippocrates* to reduce the Arm; it is compoſed of two Pieces of Wood join'd together by a Hinge. When 'tis made Uſe of, the two Pieces make a right Angle, the one which ſerves for the Supporter, is parallel to the Body of the Patient, and the other which ſerves for a Leaver, is parallel with the Arm. The *Humerus* is faſtened to it by ſeveral Straps; the Angle of the two Pieces is under the Arm-pit and when the Reduction is to be made, the Leaver, or Branch of the *Ambi* to which the Arm is faſtened, is bowed down, and the Right Angle becomes acute, which makes the Extenſion Counter-Extenſion and Reduction of the Bone at the ſame Time. This Machine has a great many Excellencies.

First Perfection.

Firſt, the Arm is placed as it ought for the Relaxation of the Muſcles.

Second Perfection.

Secondly, It has a ſufficient Force, and one might give more by lengthening the End of its Leaver.

Third Perfection.

Thirdly, the Extenſion and Counter Extenſion are of an equal Strength, being produced and actuated by the ſame Cauſe, and at the ſame Time which is an eſſential Thing, in all Machines that are made Uſe of for reducing Luxations.

Deſcription

Deſcription of the Ambi, *and the Manner of uſing it.*

(A) (A) (A) The Arm faſtened by three Straps to the Leaver or Branch of the *Ambi* mark'd (B) (G) (D.)

(B) (D) is the other Branch, with its Foot (D.) It ſerves as a Stay for the Leaver, (B) (G) which is joined by a Hinge to the Point (B.) (D) (B) (G) is the right Angle form'd by the two Branches of the *Ambi* when the Arm that is faſtened is placed in its right Poſition.

(G) is the end of the Leaver whereupon the Surgeon leans with all his Might, to bring the end (G) nearer the Point (D) by deſcribing the Curve Line (G) (D.)



Defects

Defects of the Ambi.

First Defect. The first Defect of this Machine is that it thrusts the Head of the Bone into its Socket before the Extension, and Counter Extension is made. This is not proper, because every Thing opposes the Reduction when the Bone is not sufficiently distant from the unnatural Place which it took up; whereas it reduces as it were of it self, when one has sufficiently stretched the Limb, and brought the Head of the Bone to a Level with its Socket.

Remark. Experience shews us, that to make the Reduction with Ease, one ought not to thrust the Head of the dislocated Bone into its Socket, till sufficient Extensions are made, without which all Attempts are unprofitable. In using the *Ambi* one falls into this Error, because it thrusts the Bone towards its Socket at the same Time that ir extends the Arm. The Defect of the *Ambi* is always found, whether the Ladder or the Door are used, as some have experienced, to the Disadvantage of the Patient.

Seventh Method.

Manner of Reduction with a Stick. There are also several other Methods laid down by the Antients to make the Reduction of the *Humerus*: As to place a Stick upon the Shoulders of two Men of equal Strength and Bigness, andto raise up the Patient with the Stick, which is put under the *Axilla*, whilst his Arm is with-held, and the Weight of the Body left to act, as when one uses the Door or Ladder.

Eighth Method.

Others have the Patient's Arm taken by a taller Man, who on a ſudden places the *Axilla* of the Arm affected, upon the Edge of his Shoulder, letting the Body hang upon his Back, whilſt he keeps the Arm before him with both Hands.

All theſe Methods have the Defect of the Door, the Ladder, and the *Ambi*; and all of them only tend to raiſe the Head of the Arm-Bone. It ſeems as if they who propoſed them, had not known any other Sort of Luxations than ſuch as happen downwards; nevertheleſs we have proved that the *Humerus* ſometimes diſlocates outwards, and very often forwards. I have ſeen this laſt Luxation thrice in one Month; therefore the Methods ought not to be the ſame for reducing all Kinds. I will now offer that which I have uſed with moſt Succeſs.

Defect.

Remark upon Authors.

Obſervation.

If any Method is preferable, 'tis that wherein one can re-unite the five following Properties or Conditions.

A Method that is preferable.

Two Properties.

Firſt, that there is ſufficient Strength.

Secondly, That the Strength is not too great.

Thirdly, That this Strength acts upon thoſe very Parts that are diſlocated, and not upon the Parts adjoining.

Fourthly, That it is equally adapted to Extenſion and Counter-Extenſion.

And Fifthly, that the Means employed in drawing, don't hinder the guiding the disjointed Bone into its natural Place, by the ſame Way which it took to leave it, at leaſt as near as poſſible; and that this be not

Remark.

done at the ſame Time as the Extenſions, and Counter-Extenſions.

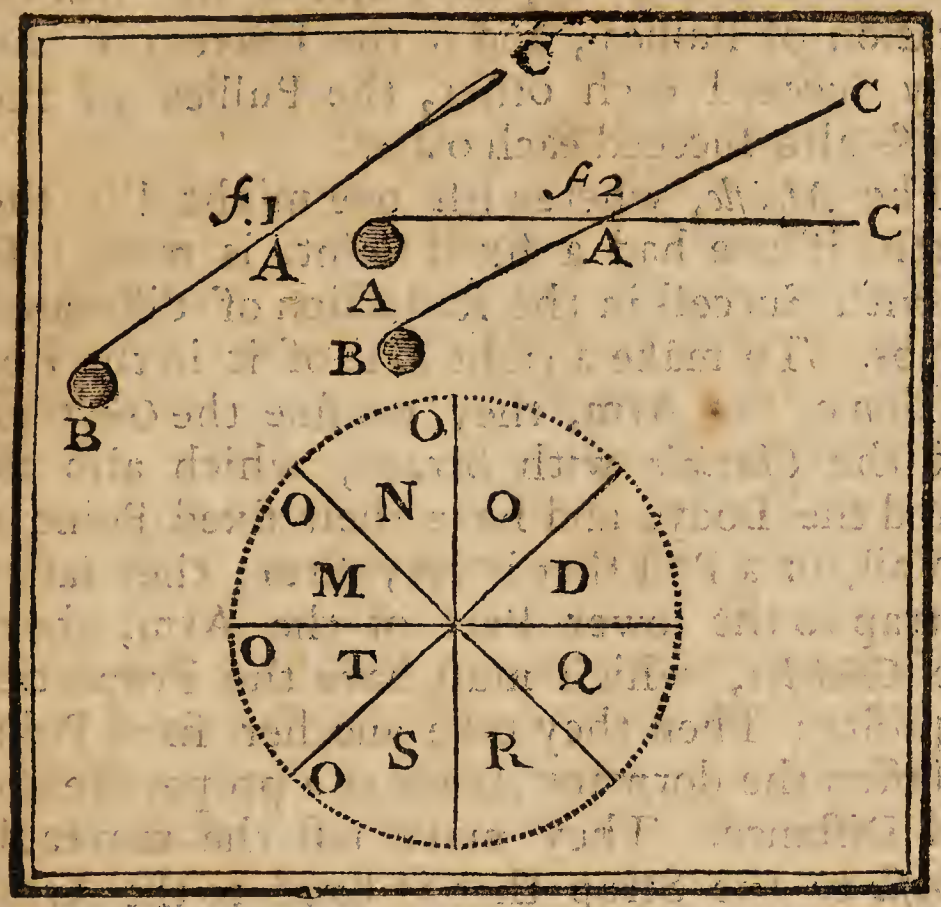
If one reflects upon what I have ſaid of Luxations in general, and the different Methods I have juſt deſcribed, 'twill be found that theſe Things are abſolutely neceſſary, and that the Want of one renders all the others vain. I ſhall not explain them farther, the rather becauſe they are to be met with in the ſubſequent Method.

Ninth Method.

The Mouſle. All the World knows that the *Mouſle* is a Machine compoſed of divers Pullies, ſet in one and the ſame Caſe. The Force of this Engine proceeds from this, that the Pully is a perpetual Leaver, and that there muſt be ſeveral Pullies to make a *Mouſle*.

To ſhew that the Pully is a perpetual Leaver, look upon the Figure on the other Side,

which



which repreſents a ſingle Leaver. The fixed Point is at (A) the Weight at (B) and the Power that moves it at (C) then join to it a ſecond Leaver (A) as in the 2d Figure, you will have the Beginning of a Wheel; and if you add yet two or three more, you will have a compleat Wheel, as may be ſeen in the 3d Figure, where four Leavers (O) (O) (O) (O) which have all the ſame Centre, make a Pully. And if inſtead of four Leavers, whereof this is compoſed, you can imagine as many as will fill the Places (M) (N) (O) (D) (Q) (R) (S) (T) you will have a full Pully. Then it is plain that the Pully is the ſtrongeſt of all Machines, ſince it is made of ſo many Leavers, which ſucceed each other in Proportion as the Pully turns; now the Mechanicks tell us that the Succeſſion of Leavers multiply the Force.

If the Pully has ſo much Force, the *Mouſle* ought to have more; for if the one is the Mul- Force of the Mouſle.

tiplication of Leavers, the other is the Multiplication of Pullies; and if the Leavers of the Pully ſucceed each other, the Pullies of the *Mouſle* alſo ſucceed each other.

The Uſe of Mouſles in Reduction.

The *Mouſle*, wherewith one might lift the Earth, if one had a fixed Point, is made Uſe of with Succeſs in the Reduction of diſlocated Limbs. To make a right Uſe of it in the Reduction of the Arm, they confine the *Omoplata* and the *Clavicle* with Straps, which alſo tie round the Body, and have their fixed Point in a Wall, or a Poſt that is very firm; they faſten a Strap to the lower Part of the Arm, above the *Condyles*, which muſt have the Properties requiſite: Then they take another fixed Point to faſten the dormant *Mouſle* at a proper Height and Diſtance. They make faſt the moveable *Mouſle* to the Strap that is fixed to the Arm; they give the Cord to ſomebody who draws as long as they deſire, while they keep their two Hands upon the Articulation to obſerve what paſſes there, and watch attentively the Minute when they muſt work to replace the Bone. This Minute is the Time when the Extenſions are ſufficient, which is known by the Signs beforementioned.

When the Surgeon ſees that the Muſcles are ſufficiently ſtretched by the Extenſions, he goes to work, but differently according to the various Kinds.

Different Ways of working.

If the Bone is diſlocated downwards, he muſt take hold of the Arm, as near as poſſible to the Arm-pit; the four Fingers of each Hand not making a Circle round the Arm, but being placed a little obliquely, their Ends turned towards the *Axilla*, in the inner Part of the Arm, the Palm of both Hands leaning, the one upon the Muſcles *Flexores*, and the other upon

on the *Extenſores* of the *Cubitus*; in ſuch a Manner as that his two Thumbs, and the two *Thenars*, may be parrallel to each other, and placed on the external Part of the Patient's Arm. The Wriſts and the Elbows muſt alſo be a little near one another: This Poſture of the Surgeon's gives him the Liberty of raiſing eaſily the upper Part of the Arm with his Fingers, of bending the lower Part with his Elbows, which may be executed readily: For in bending down his Elbows, he will bow the lower Part of the Arm, and in raiſing his Fingers, he raiſes the Head of the *Humerus*, which will conduct it into its Socket, by making it (if I may ſo ſay) turn topſy turvy. One Way of working.

If the Head of the *Humerus* is turned outwards under the Root of the *Acromion*, and the Spiny *Apophyſis* of the *Omoplata*, the Surgeon being on the outſide of the Arm, ſhall (after the Extenſions being ſufficiently made with the *Mouſles*) lean the Palm of one Hand upon the lower and inner Part of the Arm, and the other upon the upper Part near the Shoulder. Then, thruſting ſtrongly with both Hands, let him puſh the lower Part of the Arm outwards, and the upper inwards, which will force the Head of the *Humerus* into its Socket. Another Way.

When the Head of the *Humerus* is diſlocated forwards under the great Pectoral, between the *Apophyſis Coracoides*, and the *Clavicle*; they make in the like Manner Extenſions with the *Mouſle*, and when they are ſufficient, the Surgeon thruſts the Head of the Bone into the Cavity of the *Omoplata*, by puſhing with one Hand the lower Part of the *Humerus* from without inwards; and with the other, the upper Part of the *Humerus* from within outwards. Another Way.

Prologue. This Method of reducing the *Humerus* with *Mouſles* is ſimple; it would be preferable to all others, if the *Mouſles* carried with them their fixed Point. 'Tis this that has rendered it neceſſary to reduce them into the Compoſition of a Machine, which can carry with it the fixed Point for Extenſion and Counter-Extenſion. 'Tis not of yeſterday that Machines of this Kind have been invented for the Reduction of Bones. We have *Hippocrates*'s Bench, which has been in Uſe many Ages, and which has been brought to Perfection by ſeveral Surgeons, the late Mr. *Michau* had ſucceeded more than any one; but his Machine did not anſwer all the Purpoſes that might be deſired.

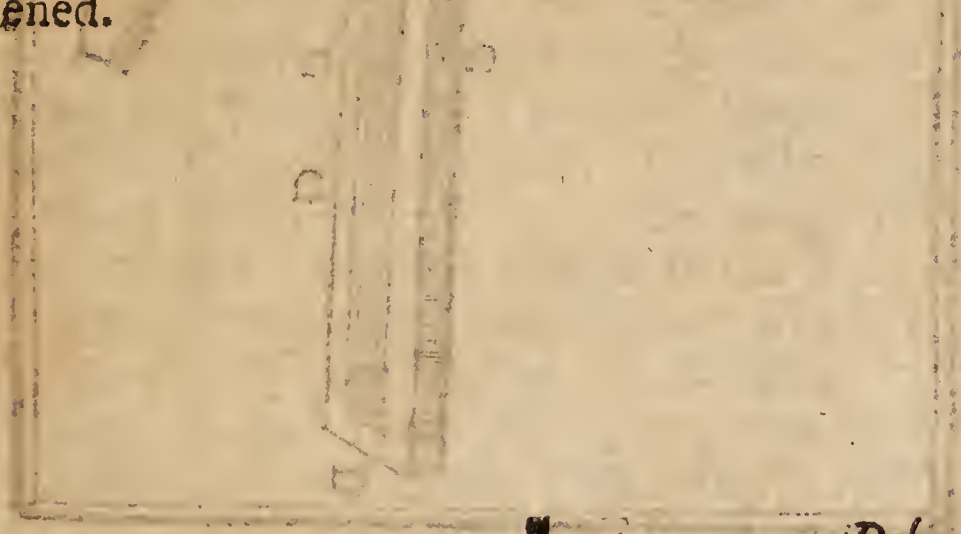
Hiſtory of the Machine for reducing Luxations. In 1702. I endeavour'd to correct *Hippocrates*'s Bench with ſome Succeſs; but, in Spite of this Correction, I found ſo many Defects in it, in a Tryal that I made of it on a Luxation of the Thigh, that I reſolved upon inventing a Machine entirely new. I made it publick in 1705, in the firſt Edition of this Treatiſe, in a publick Courſe that I went thro' at St. *Coſmus*. In 1706 I expoſed this Machine which I had improved a ſecond Time. It ſerved me ſucceſsfully ſeveral Years, but the Reflections that I made upon continual Practice engaged me to form divers Obſervations on it, and I thought in its utmoſt Degree of Perfection, when in 1710 a Luxation of the Arm, of Six Months of ſtanding, foiled me. I found out the Cauſe it, and added a Piece, wherewith I ſucceeded the next Morning. In 1716 I preſented it to the Academy; it is in the Memoirs of that Year. I uſed it with Satisfaction, until new Difficulties aroſe in Caſes which I could not foreſee. This has induced me to make new Corrections in that which I now reccommend.

Its Progreſs.

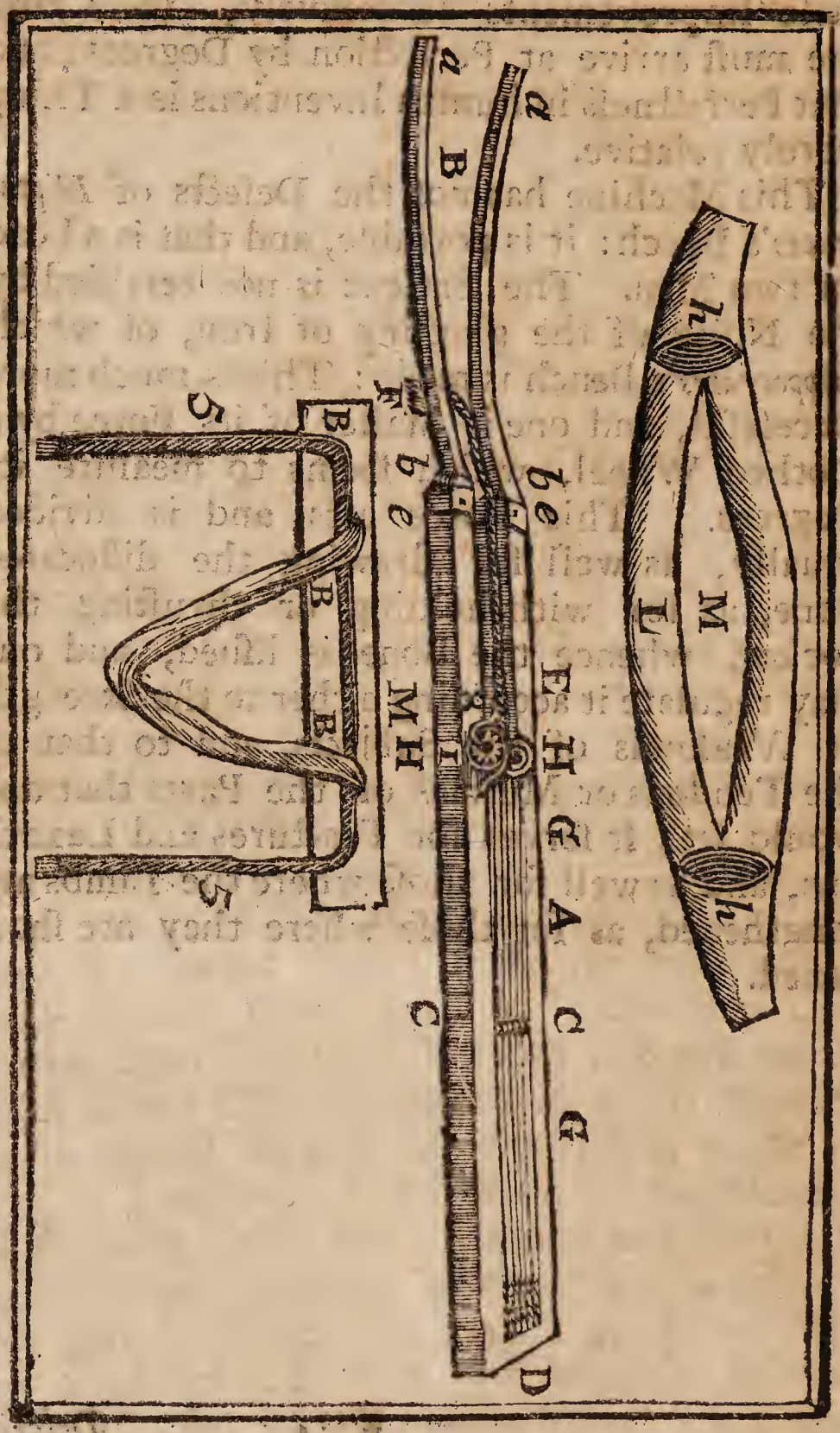
It

It has in it all the Properties of the firſt, and a great many others, which I ſhall particularize in the Deſcription I now make of it. All theſe Improvements ſucceſſively, ſhew that one muſt arrive at Perfection by Degrees; and that Perfectneſs in human Inventions is a Thing merely relative.

This Machine has not the Defects of *Hippocrates*'s Bench: it is portable, and that is a Load for two Men. The Patient is not terrified by the Noiſe of the gingling of Iron, of which *Hippocrates*'s Bench is made: This is much more ſucceſsful, and one is Maſter of its Force by a toothed Wheel, which ſeems to meaſure its Degrees. This Force acts and is divided equally, as well for drawing the diſlocated Bone, as for with-holding or thruſting the Socket, whence the Bone is iſſued, and one may regulate it according either to the Strength or Weakneſs of the Subjects, and to that of the Tendons or Muſcles of the Parts that one would ſet: It ſerves for Fractures and Luxations, and as well for thoſe where the Limbs are lengthened, as for thoſe where they are ſhortened. Advantages of this Machine.



Description of the New Machine.



This Machine is of two Parts. One which is called the Body (A) and the other which I ſtile the Branches (B.)

The

The Body is compoſed of two Cheeks (C) (C) of Oak, (which are ſtrait and parallel to each other) two Foot eleven Inches long, two Inches broad, and eighteen Lines in Thickneſs. Deſcription of the Body.

They are diſtant from each other ſixteen Lines. There are two Traverſes or Croſs-Pieces, which hold them together, and are pinn'd to them by Tenons, Mortiſes, and Pins. One of theſe Croſs-Pieces is placed at the End of the Cheeks; it is even with them on the upper Side, and within four Lines of the lower one, to leave Room for a little Plank which enters therein like a Groove, whereof we ſhall ſpeak hereafter. The other Traverſe or Croſs-Piece, is two Foot five Inches diſtant from the firſt, and is even with the Cheeks underneath, but on the upper Side wants four Lines of it; it is alſo cut hollow, Arch-wiſe, for the Paſſage of a ſilk Cord, whereof Mention ſhall be made hereafter: It is joined like the other to the thick Part of the Cheeks.

Between the Side of the two Cheeks that face each other from the lower Traverſe to the upper, there are two Grooves or Gutters; one is in the middle of the thick Part to lodge the Tongues of a wooden *Mouflet*, which ſhall be deſcribed hereafter. The other Groove is even within two Lines of the under Part of the Cheeks. It gives Paſſage to the Tongue of the little Plank abovementioned, which is ten Lines broad, (without comprehending its two Tongues) four Lines thick, and two Foot five Inches long; inſomuch, that being in its Place, it ſtops up two Foot five Inches Space between the two Cheeks. It paſſes under the firſt Traverſe, and goes on to join it ſelf even with the lower Part of the ſecond. The Remainder

of

of the Space that is between the Cheeks, is filled up by a little Plank five Inches long, and of the ſame Thickneſs and Breadth as the firſt, which is fixed at the Place where the firſt enters into the Groove, whence it can be drawn out to give Liberty for fitting the *Mouſles*, and their Cord alſo; or for taking them out and mending them according as is neceſſary. Theſe *Mouſles* are two; the one dormant; which is joined by a Tenon introduced into the Mortiſe that is made in the Traverſe, at the End of the two Cheeks. A Peg (D) paſſing thro' the Traverſe, penetrates the Mortiſe and Tenon of this *Mouſle*, and keeps it dormant. The other *Mouſle* (E) is moveable; it has two Tongues which enter into the Grooves of the two Cheeks, and give it the Liberty of moving backwards and forwards. At its Head are Holes, thro' which the Strings of a double ſilk Strap (F) paſs, which is 6 Lines broad, an Ell long, and of a Triple Weft. This Strap has divers Knots about two Inches diſtant from each other; the Knot which is at the Extremity ſerves as a Button, and the Spaces which the others leave between them, are as the Holes wherein one faſtens the firſt Knot, which forms a Loop wherein the Strap (B) (B) is fixed, which draws the Limb that is to be ſet. There are ſeveral of theſe Button-holes (if I may ſo call them) the one near the Button, the other at a Diſtance; they are all uſed to fit the Strap to the Length of the diſlocated Part.

Sequel of the Deſcription.

Deſcription of the Mouſles.

There are two *Mouſles*, the one dormant, as has been ſaid, the other moveable; their Caſe is of ſquare Wood: Each of them has ſix Pullies, thoſe of the firſt Row have one Inch Diameter, thoſe of the ſecond ten Lines, and all

of

of them are three Lines thick. One runs thro' a ſilk or flaxen String, of a Line and half Diameter, and 27 or 28 Foot long, whereof one End is made faſt to the Caſe of the dormant *Mouſle*, beneath the Row of ſmall Pullies. The other End of the String is faſtened to the Eye of a Pin which goes thro' the Axle-Tree, whereof we are going to ſpeak.

The Beams.

Two Foot from the End of each Cheek in their thick Part, two Beams, or upright Pieces of Wood (H) (H) riſe up like Walls 28 Lines high, and 8 in Thickneſs, even with the outward Part of the Cheeks. They are joined by Tenons rounded at Top, and pierc'd by an Iron Linch-pin of four Lines Diameter, the two Ends whereof are Square, and go beyond the Beams an Inch of the *Radius*. The Linch-Pin carries between the Beams a wooden Axle-Tree, turned like a Bobbin, of an Inch Diameter, thro' which runs a little Iron Pin that is riveted at one End, and has an Eye at the other, wherein one of the Ends of the String is made faſt. At the exteriour Side of one of the Beams, there is an inchaſing of 16 Lines Diameter, hollowed within four Lines of its Thickneſs, wherein an Iron-Wheel (I) is ſet, of 15 Lines Diameter, and two in Thickneſs, thro' which the Linch-pin paſſes. Its Teeth, which are made Rock-wiſe, are ingrail'd with, and check'd by, the Beak of a Spring 30 Lines long, 4 broad, and half a Line Thick, ſhaped like a *Roman* (S) whereof the End that is moſt bent is fixed by two wooden Screws on the Ledge, of the Thickneſs of the Cheek. At the End of the Spring, which I call the Beak, and which is ingrailed with the Teeth of the Wheel, there is, on its convex Side, a little Catch, which, when drawn, ſerves to diſengage the

The Axle-Tree.

The toothed Wheel.

The Spring.

the Spring from the Teeth of the Wheel when 'tis requiſite to relax the *Mouſles*. This Spring is ſupported by, and reſts upon, a little Iron-pin, of one Line Diameter by 4 of Projecture, which enters Screw-ways into the Notch, *&c.* of the Beam, which lodges that Part of the Spring, which is check'd by the Teeth of the Wheel.

Deſcription of the Branches.

The Branches of the Machine are alſo compoſed of two wooden Cheeks (*a*) (*a*) but they are neither ſtrait, nor parallel with each other. They are arched before like a Bow, whoſe Arrow is 18 Inches long; their Length is 2 Foot 3 Inches, including a Tenon 4 Inches 9 Lines long, by 8 Lines Diameter. Theſe Tenons come out of the Part which is ſtrongeſt, and is as the Baſis or Root of the Branches. This Baſis (*b*) (*b*) is Square, of the ſame Breadth and Thickneſs as the End of the Cheeks that belong to the Body of the Machine: It reſts upright upon this wooden Surface, and the Tenon of 4 Inches 9 Lines enters into the Cheeks of the Body of the Machine, and touches, with three of its Sides, 3 Sides of a Sort of Mortiſe made of the like Size, in the Fore-part of the Cheeks that belong to the Body of the Machine, inſomuch that the End of the Tenons reſts upon the Traverſe that is above the Axle-Tree. And to give the End of theſe Cheeks ſtrength enough to retain theſe Tenons, and the Baſis of the Cheeks of the Branch, they are ſupported by an Iron Ring (*c*) (*c*) which covers them all but the Sides whereby they face each other, where Paſſage is left for the ſilk Strap. This Ring is an Inch broad, and a Line thick; it is retained by three wooden Screws; one upon the little dormant Plank, and the other two on the Fore-part of each

each Cheek. The Tenons are parallel, but the reſt of the Cheeks are not. At their Baſis they are only 16 Lines diſtant, they are held together by two Traverſes, the firſt begins within an Inch of their Baſis, and is 18 Lines broad, and an Inch thick; as for its Length between the Cheeks, it has 16 Lines toward the Baſis, and 18 towards the Extremity of the Cheeks, becauſe that as ſoon as the Cheeks begin to grow diſtant from each other, the ſecond Traverſe, which is but 14 Lines from the firſt, is 20 Lines long between the Cheeks towards the firſt Traverſe, and 2 Inches towards the End of the Cheeks; which Cheeks continuing to grow yet more diſtant, are at their Ends 7 Inches and a half diſtant from each other.

The Traverſes are joined to the Cheeks by Mortiſes and Pins with covered Joints, they are flat above, and round underneath. The Cheeks or Branches do not retain their Square Figure, which they have at their Baſis, where they are fitted to the Cheeks belonging to the Body of the Machine; they are octogonal the reſt of their Length, and decreaſe gradually, ſo that they have one Inch Diameter at the firſt Traverſe, and but 8 Lines at their Ends, where they are blunt and rounded that they may lodge themſelves eaſily in two Sheaths, which are at the Ends of a Sort of Strap that I call Buttreſs, and ſhall deſcribe hereafter.

The Manner of making Uſe of the Machine.

To make Uſe of this Machine, one muſt have two other Pieces, the one ſerving to with-hold the Body, and the other to draw the Limb. I call the firſt the Buttreſs, and the ſecond the Strap. The Buttreſs (L) is made of a Piece of Ticking, a Foot long, and

3 Inch-

3 Inches thick, with a Sort of Button-hole in the middle according to its Length: This Slit or Button-hole is 9 Inches long; the Remainder of the Ticking, which is not slit, equally limits both; underneath each of which Limits there is a Pocket or Sheath (*h*) (*h*) made, which, as I have said, serves to lodge the Ends of the Branches of the Machine. This whole Piece of Ticking is lined with Shammy, that it may not hurt the Body nor the Limb, which is to pass thro' the Slit (M) 'Tis thus that the Body is with-held by this Buttress.

The Piece that makes the Counter-Extension.

The Piece which makes the Extension.

The Piece which serves to draw the Limb is called the Strap, and is made of a Piece of Shammy, double and stitched, being 14 Inches long, and two and a half broad. In the middle of it, length-ways, is a silk Cord (5) (5) of a double Weft, 3 Quarters of an Ell long, and ten Lines broad, which passes thro' the two Loops of a Boot-strap covered with Shammy. The silk Cord is sowed to the Piece of Shammy, about the middle of the Cord, and near each End of the Shammy, so that the Stitching does not hinder either the removing the Loops of the Boot-strap from, or bringing them nearer to, each other; so that it may suit with the different Sizes of the Limbs to which 'tis fastened.

This Strap (B) (B) which is 18 Inches long, and one broad, makes a Loop of nine Inches, thro' which the silk Cord, which is fastened to the Head of the moveable *Mouffle*, passes. The Piece of Shammy (B) goes round the Limb, and is put in the Room of the circular Compress which 'tis customary to use, to avoid the Strap's hurting. I make use of Shammy which is much softer than Linnen. The silk Cord (55) goes twice round the Shammy, pas-

sing

sing a second Time thro' the Loops (BB) after which it is fastened and ty'd to a Knot and a Rose; this done, the Machine entirely mounted must be placed under the Limb, and the Ends of the Branches must be made fast in the Pockets or Sheath (*hh*) of the Buttress (L.)

Working of the Machine.

The Strap (F) of the moveable *Mouffle* (E) must be put thro' the Loop of the Strap (BB) which is fastened to the Limb; and its Knot must be fixed, in passing by, in one of those Button-holes; then one puts on the Handle marked in the Machine (M) at the Linch-Pin of the Axle-Tree, and turns as much as is requisite for the Extension and Reduction of the dislocated Limb.

Properties of the Machine.

I have render'd this Machine much more portable than heretofore; it was both longer, broader, heavier, and of one single Piece; and this takes in Pieces into two: It is also easier to work, since the Operator may govern the Handle with one Hand, and the dislocated Part with the other.

The Branches arched like a Bow, leave a Space between them and the Limb, which renders them convenient for passing the Hand under both for judging of the Progress of the Extensions, and for thrusting the Bone where 'tis proper. Besides, the Branches of the first Machine being strait, the Limb was incommoded; moreover the Buttress not being slit, did not with-hold the Body so exactly as this; and the new Strap, which serves to draw the Limb, is much softer, stronger and easier to apply.

Example serving as a Recapitulation.

Repetition.

These Sort of manual Operations can't be repeated too often, wherefore, to the End that

young

young Surgeons may the better understand it; I will suppose the Arm dislocated, and will shew them all that must be done either before, during, or after, the Operation.

Before the Operation, one must place the Patient well, and examine well the kind of Luxation, having the Machine and Dressings all ready, and applying the Straps to it.

He must be upon a Chair two Foot high, the sound Part leaning against the Back of it, which, if possible, must be but a Foot and half high; and the dislocated Side must be free and disengaged from all Things that are capable of troubling the Operator.

The Part must be examined, and 'twill easily be found where the dislocated Bone is lodged, provided one comprehends well all the Signs that we have given to distinguish the different Kinds mentioned heretofore.

Disposition of the Machine. The preparing of the Machine consists in joining its two Parts together, in removing the moveable *Mouffle* from that which is dormant as much as can be, and in taking Care that the Cords are not intangled; in this Case one applies it as is shown hereafter.

For the Dressing; the Figure whereof is represented hereafter.

Dressings. There must be a Compress folded 8 double, 8 Fingers Breadth long, and 4 broad; another Compress cut like a half Cross of *Malta*, 8 double, 8 or 9 Inches long and broad: Another Compress between 7 and 8 Inches broad, 4 double, and a Foot and half long; two Rollers, one six Ells long, and 2 Inches and a half broad; and the other 2 Ells long, and 2 Inches broad;

broad: A roll'd Compreſs, a Pellet, and a Scarf for the Hand.

In applying the Strap, regard muſt be had to divers Things: Firſt to have the Skin of the Arm well drawn up by the Hands of an Aſſiſtant, who keeps it raiſed during the Application of the Strap, to the End that from the Strap to the Arm-pit there may be as much Skin as poſſible. When one does not take this Precaution, it happens (eſpecially in fat Perſons) that all the Efforts of the Extenſion act only upon the Skin: The Bones and the Muſcles are not drawn, and one can't remove the Bones at a Diſtance enough to reduce them. Circumſtances to be obſerved. First Circumſtance.

Secondly, to lay on the Piece of Shammy (B) inſtead of a Linnen Compreſs, immediately above the *Condyles* of the *Humerus*, then to place and tye over it the Strap mark'd (BB) to bind it very hard leaſt it ſhould ſlip, to tye it even twice, and with more Strength, on thoſe who are pretty fat, without which the Strap would not come near enough the Bone of the Arm, nor bind it cloſe enough; and the Force wou'd act upon the Fat, and have no Effect upon the Bone which is the eſſential Point. Second Circumſtance.

Thirdly, the two Parts of the Strap which make the Loop, muſt be placed, one before the external *Condyle*, and the other behind the internal one. 'Tis proper to obſerve this Poſition, becauſe if theſe Parts of the Strap were upon the *Condyles* they would bruiſe them; and if the Part, which I ſay muſt be placed behind the internal Condyle, were before, it would bruiſe the Veſſels. Third Circumſtance.

The Strap being faſtened, one muſt place the Buttreſs (L) thruſting the Arm into the Button-hole as near the Shoulder as poſſible; ſo that one of the Sides of the Slit bears againſt Of the Buttreſs.

the *Clavicle* and the *Acromion*; and the other againſt the under Rib of the *Omoplata*. The two Ends (*kk*) muſt be turned one towards the *Sternum*, and the other towards the external Face of the *Omoplata*.

I can't forbear correcting here a great Error in all the Methods before-mentioned, and all thoſe laid down by Authors; 'tis this: that they have taken no Care to with-hold the *Omoplata*, and the *Clavicles*. They have contented themſelves with with-holding or thruſting back the Body, whilſt they drew the Arm, which is not ſufficient; ſince the Shoulder follows the Arm when it is drawn, and the Extenſion is fruitleſs. It has been demonſtrated that one muſt remove the diſlocated Bones at a Diſtance from each other, to put the Head even with its Cavity from whence it has iſſued, and into which one would have it return.

Remark. As it has been ſaid in general that the Extenſions and Counter-Extenſions muſt be made upon thoſe very Bones that are disjointed, and not upon thoſe next to them, if any one has had Succeſs in ſetting the Arm, without having the Precaution to with-hold the Shoulder, it has been at the Expence of the *Trapezius*, the little *Pectoral*, and *Rhomboides*, which have had Strength enough to keep back the *Omoplata*; a Strength which they have not always, and to which one ought not to truſt, it being dangerous to put it to the Teſt.

How one muſt place the Machine. When the Buttreſs is put on, the Ends of the Branches of the Machine muſt be placed in the two Sheaths which are at the Point (*kk*) of the Buttreſs. The String (F) muſt be run into the Loop of the Strap (BB) and one of its Knots muſt be faſtened as it paſſes by in one of its Button-holes; then one claps on the Handle

dle (M) at the Linch-pin of the Axle-Tree, and begins the Operation, during which, what follows muſt be obſerved, *viz.* That the lower End of the Machine reſts upon the Ground; that if 'tis the left Arm, the right Hand to the Handle, and the left upon the Shoulder of the Patient. Working of the Machine.

This done, one turns the Handle, and the Cord of the *Mouſles* winds round the Axle-Tree (K) which brings the moveable *Mouſle* near the dormant one, and draws the Arm on the ſame Side, whilſt the Shoulder is kept fixed; ſo that in Proportion as the Handle turns, one removes the Head of the *Humerus* from the unnatural Place wherein 'twas lodged, to bring it near the Cavity of the *Omop'ata* which is its natural Seat, wherein it ſometimes places its ſelf without any other Operation; and ſometimes one muſt work with the Hands alſo to guide it thither, which muſt not be done till the Extenſion is found to be ſufficient by the Way that the *Mouſle* has took, and by the ſtretching of the Muſcle *Deltoides*. Time to reduce the Bone. Signs that the Extenſion is made or making.

'Tis known that the Bone has placed it ſelf, as it were of its own Accord, by the Noiſe it makes in re-entring, and by a roundneſs that is perceived at the *Acromion*, at the Place where there before appeared a Hollowneſs. Signs that the Reduction is made.

To facilitate the Reduction of the Bone when luxated outwards, the lower End of the Machine muſt be turned outwards, that the Head of the Bone may throw it ſelf in. Means to reduce the Bone luxated outwards.

To facilitate the Reduction, when the Head is forwards under the *Pectoral*, the lower End of the Machine muſt be thruſt forwards, to carry the Head of the Bone on the contrary Side. For the Bone luxated inwards.

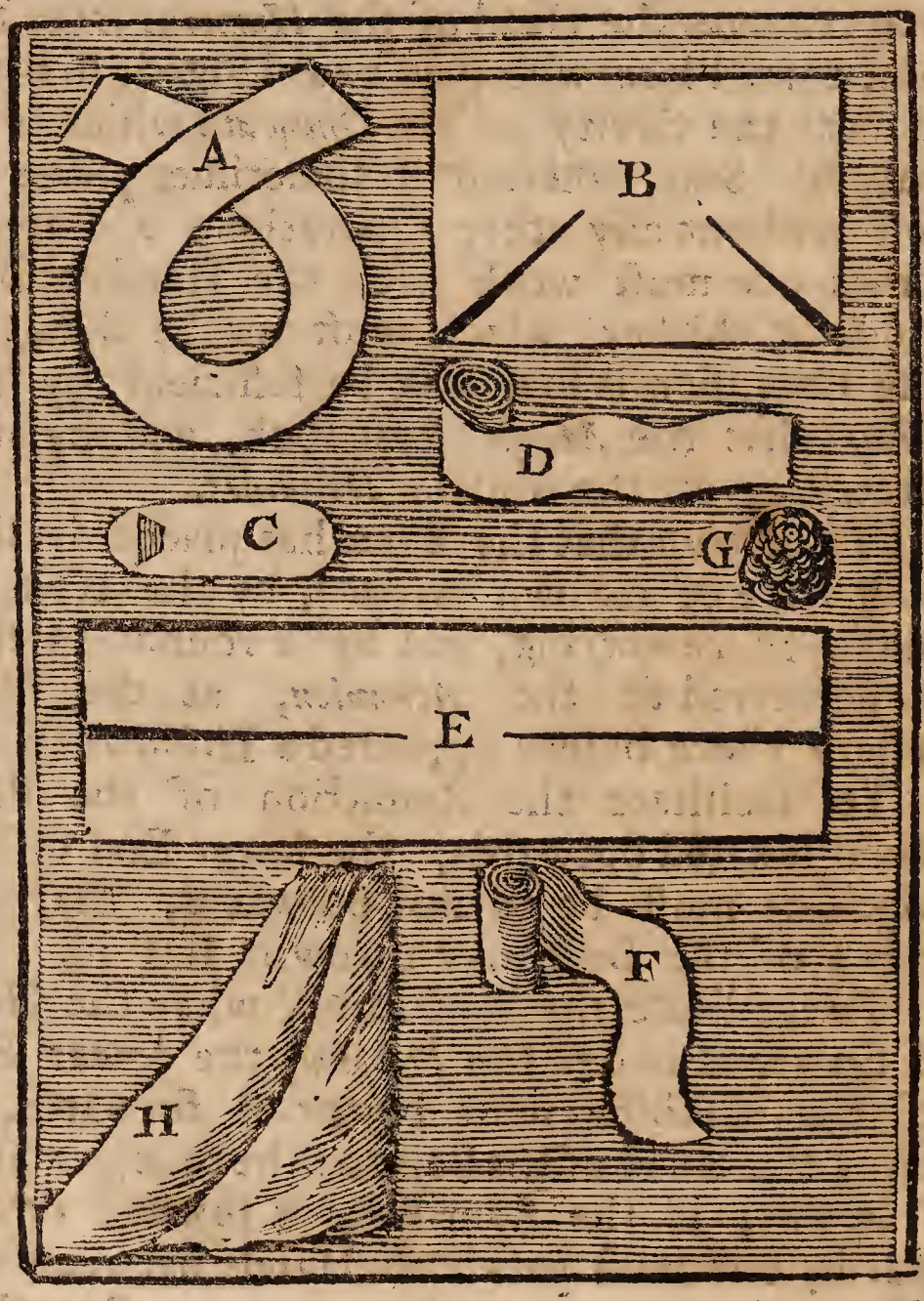
In fine, if the Arm-Bone is luxated downwards, one muſt paſs both Hands between the For the Bone luxated

downwards.

Branches, join them together under the Armpit, raiſe the Head of the *Humerus*, bow down the lower End of the Machine, and the Reduction is made.

What muſt be done after the Reduction.

After the Reduction, the String of the Machine that is put thro' the Loop of the Strap muſt be untied, having the Strap held by ſome Body who draws it by its Loop, and taking off the Machine and the Buttreſs. Then leaning the left Hand upon the *Acromion*, and the right under the Elbow which one brings near the Patient's Body, one puts on the Dreſſings, *viz.*



The

The Compreſs (A) its middle under the Arm-pit, and its two croſs Ends over the *Acromion*, to wrap round the Shoulders; then the Compreſs (B) which covers the whole again, and afterwards the Compreſs (C) which trims the bottom of the Arm-pit; the Roller (D) which makes the *Spica* round the Shoulder: One muſt afterwards lay on the Compreſs (E) which covers the Arm and the Elbow at the Place where the Strap was faſtened. This Compreſs muſt be kept on by the Roller (F) which muſt make circular Caſts round the Arm, and then a Figure of 8 paſſing from the Arm to the Fore-Arm, and back from the Fore-Arm to the Arm. One muſt put into the Hand the Pellet (G.) All theſe Dreſſings muſt be dipped in Brandy wherein Alum has been ſteeped.

Application of the Dreſſings.

One muſt cover and ſupport the Hand, Fore-Arm and Arm, with the Scarf (K) made with a fine Napkin, that muſt be at leaſt two Thirds of an Ell long, and as much in Breadth. It muſt be folded from one Corner to the other in a Diagonal Line, which will give the Napkin the Figure of a Triangle. It being thus folded, muſt be put between the Arm and the Breaſt of the Patient, ſo that the right Angle may be under the Elbow, and the great Side of the Triangle under the Hand. Of the two acute Angles, one muſt be placed over the right Shoulder, and the other turning back again and covering the Fore-Arm, muſt go over the left Shoulder to meet that which went over the Right. They muſt be ſow'd together to keep them at a proper Height, after this, take the two Angles of the Napkin, at that Part which is at the Elbow, and ſeparate them, drawing the internal Angle backwards, ſo that the main Part of the Fore-Arm be almoſt at

The Scarf.

The Manner of putting it on.

the Center of the Napkin; then one muſt fold again theſe two Angles, *viz.* the Angle that is before under the Hand, and that which is behind under the Arm, bringing them near, and faſtening them to each other, and to the Body of the Scarf with a ſtrong Pin.

Remark. This Scarf is the moſt proper, becauſe it wraps round the whole Limb from the Shoulder to the Fingers Ends, whereby no Riſque is run of the Patient's acting imprudently, or diſordering his Dreſſings, as happens but too frequently.

Remedies. The Scarf ought to ſupport well the Elbow, and keep the Fore-Arm bent almoſt in a right Angle, the Hand being of an equal Height with the Elbow.

Regimen. The Patient muſt bleed once, twice, or thrice, according as is neceſſary: He muſt alſo obſerve a proper Dyet. As for the reſt, you will perfect the Cure, by obſerving what has been ſaid in General upon the Subject of Accidents and Symptoms that precede, attend, or follow the Reduction.

They who are Maſters of what I have ſaid of Luxations in General, and what has juſt been mentioned about that of the Arm, may be in a Condition to cure the others; at leaſt there will be but little wanting. Theſe two Chapters include the whole Theory and Practice of Diſlocations, for which Reaſon I have enlarged very much both upon the one and the other.

CHAP

CHAP. VIII.

Of the LUXATION *of the Fore-Arm from the Humerus.*

Structure

THERE are two Bones in the Fore-Arm which are jointed with the *Humerus*; this Junction is one of the moſt compact *Ginglymus*'s that can be, and the moſt difficult to luxate.

The *Cubitus* makes the greateſt Part of the *Ginglymus*, it cannot move without the *Radius*, but the *Radius* moves without it in making the Pronation and Supination.

The Kinds and Difference.

The Fore-Arm luxates before, behind and on the Sides. I have never ſeen one diſlocated forwards, and I believe ſuch a Luxation very difficult. If it does happen, the Arm muſt be ſtretched out, becauſe the *Biceps* and the *Brachiæus internus* are relaxed, and the *Extenſors* are ſtretched by the Diſtance of the *Olecranum* where they inſert their *Aponeuroſes*.

Remark and Signs.

When it is diſlocated forwards, the *anterior Apophyſis* of the *Cubitus* is lodged in the hinder Cavity of the *Humerus*; and the Fore-Arm is a little bent, becauſe of the Diſtance of the Inſertion of the Muſcles, which being greater in the *Extenſors* when the Luxation is forwards, ought on the contrary to be greater in the *Flexors* when the Luxation is backwards.

Signs.

When the Luxation behind is incompleat, the anterior Eminence of the *Cubitus* is at the Centre of the Kind of Pully made by the Arm-Bone. At that Time the *Muſculi Flexores* are a little leſs extended, and the *Extenſores* leſs re-

laxed, than in the compleat Luxation behind; and the Fore-Arm is a little leſs bent in the Compleat than the incompleat. The Pain is violent when one extends the Elbow, and the Patient finds Relief when one bends it.

Signs. When 'tis compleat inwards, the Veſſels ſuffer conſiderably; and ſometimes they are ſo torn, that it occaſions *aneuriſmal* Tumours, or *Tromboſes*, which one is often obliged to open and cauſe ſuppurate.

Signs. When 'tis incompleat, the internal Semi-lunar Cavity of the *Cubitus*, receives the internal Eminence of the *Humerus*; and as this Eminence is a little leſs raiſed than that which receives the external Cavity of the *Cubitus*, the Fore-Arm is turned a little outwards, the *Radius* is near the middle Eminence of the *Humerus*, the internal Part of the Arm is leſs raiſed than in the compleat Luxation, and the Veſſels alſo are in Pain.

Signs. When the Diſlocation is compleat outwards, the Veſſels are only a little ſtretched, but don't ſuffer ſo much as in the internal Luxation. There is a great Prominence outwards towards the Fore-Arm, and a conſiderable one inwards towards the Arm. The firſt is formed by the Preſence of the two luxated Bones, and the ſecond by the lower End of the *Humerus*.

Situation of the luxated Bones. The incompleat Luxation may happen two Ways; the firſt is outwards, in which Caſe the *Radius* is entirely diſlocated, and no longer receives the Eminence of the external *Condyle*; the exterior Cavity of the *Cubitus* receives the external *Condyle*, and the inward Cavity of the *Cubitus* receives the Eminence that its outward Cavity did before receive.

Situation of the luxated The ſecond is inwards, the *Radius* no longer touches the external *Condyle* of the *Humerus*, it receives

receives the middle Eminence; and the inner Cavity of the *Cubitus* no longer touches the internal Eminence of the *Humerus*. Bones.

The Cauſes are amply particulariz'd in treating of Luxations in general, to which may be added that the Luxation forwards never happens, but thro' a violent overſtraining on the Side of the Extenſion by a great Fall, or ſome other extraordinary Cauſe. Cauſes.

The Luxation behind is moſt commonly occaſioned by a Strain on the Side of the Flexion. I ſay moſt commonly, becauſe I have known one behind cauſed by a Strain on the Side of the Extenſion, in a Lady that was very fat, unweildy, and heavy, who fell in her Chamber upon her right Hand. The Fore-Arm was extended, and the Weight of her Body being greater than the Reſiſtance of the Fore-Arm, forced it to bend on the Side of the Extenſion. The lower Part of the *Humerus* broke the *Biceps*, and the *Brachiæus Internus*, whoſe Ends came out thro' the Skin; the *Humerus* iſſued out of the Wound, and reſted upon the Floor: The *Olecranum* mounted up above four Fingers Breadth behind the *Humerus* under the Skin, The Extenſions and the Reduction were made with Eaſe; the Part of the *Biceps* which iſſued thro' the Wound the Length of a Thumb, cou'd not be replaced; it was forced to be cut off. The Fore-Arm was bent, and the Lips of the Wound were in the Bending. This Poſition which was favourable to the Re-union, was not leſs ſo to the Luxation; both the one and the other were cured in ſix Weeks. Cauſes. Obſervation.

The Luxations on the Sides don't happen eaſily, becauſe the Motion of the Articulation neither favours the ſallying of the Bone inwards Obſervation.

inwards nor outwards. The Fall must be complicated, and besides the Fore-Arm must be in Extension at the Time of the Fall. Falls may be complicated several Ways; For Instance, I once saw a Luxation outwards in a Footman, who falling from a Coach that was overturned, had his Arm lock'd in the Spokes of the Wheel.

Observation. Another had his Elbow dislocated inwards by being thrown with his Horse, who fell upon his Arm in an uneven Place, whereupon the lower Part of the *Humerus* rested; and the Fore-Arm not being supported gave Way to the Weight of the Horse which thrust it inwards.

Remark. Therefore I believe that the Fall must be complicated to produce either inward or outward Luxations.

Remark. The Dislocations on the Sides are generally incompleat, because the Surface of the Bones is so considerable at the Place of their Jointings, that an entire Dislocation cou'd not happen without a total Rupture of the Ligaments, and sometimes of the Muscles.

The Cure. The Manner of reducing these Luxations is different, according to their Kinds; nevertheless both in the one and the other, one must make the Extension and Counter-Extension, and thrust the Bones into their Places.

Manner of reducing the Bone. If the *Olecranum* is in the Cavity of the *Cubitus*, the Surgeon to reduce this Luxation, puts his Elbow in the bending of the Arm; he joins the Palm of the Patient's Hand to the Back of his, and holds them both strongly with his other Hand; then he bends his Arm with all his Might, which makes the Extension and Counter-Extension at the same Time.

This

This Method is not the beſt. Authors have propoſed a Bed-poſt, or ſomething like it to make the Reduction thus. If 'tis a Bed-poſt, they ſet the Patient upon the Bed, with the diſlocated Side near the Poſt, which the Surgeon places having firſt covered it with Linnen, in the Bend of the diſlocated Arm: A Servant with his two Hands puſhes the Elbow againſt the Bed-poſt, the Surgeon places himſelf on the ſound Side, taking the Fore-Arm that is affected near the Wriſt with his left Hand, and the Shoulder with his right Hand, if 'tis the right Arm that is to be reduced: On the contrary, he takes the Fore-Arm with his right Hand, and holds the top of the diſlocated Arm with his left, if 'tis the left Arm that is to be reduced. Being thus placed, he brings forcibly his two Hands near each other, as if to bend the affected Arm, whilſt his Servant thruſts againſt the Bed-poſt, and the Reduction is made. Another Operation.

This Method does not always ſucceed, and may be pernicious, becauſe the Muſcles are drawn before they are ſufficiently relaxed. In Effect, the *Extenſors*, which are conſiderably ſtretched by the Diſtance of the *Olecranum*, are yet more ſo when the Extenſion and Counter-Extenſion is made with the Bed-poſt. 'Tis better to follow the Rules that I have laid down in General, which ought to be yet more regularly obſerved when the *Apophyſis Coronoides* of the *Cubitus* is found preciſely upon the middle of the Pully of the Arm-Bone. This Luxation can never be reduced by bending the Fore-Arm, if the uſual Extenſions are not firſt made. When they are, one muſt bear with one Hand upon the bending of the Arm, and with the other take hold of the Fore-Arm near the Wriſt, Defect of this Method.

Another Manner. Writ, to make the Flexion at the Minute that the Extenſions are judged ſufficient: Or elſe, if you will, you may thruſt the *Olecranum* forward from behind, which does almoſt the ſame Thing, but with leſs Force.

Another Way. When the *Apophyſis Coronoides* is in the hinder Cavity of the *Humerus*, they make ſtronger Extenſions, and they continue them till the *Olecranum* re-enters into its Place, then they bend the Fore-Arm, and the Reduction is made.

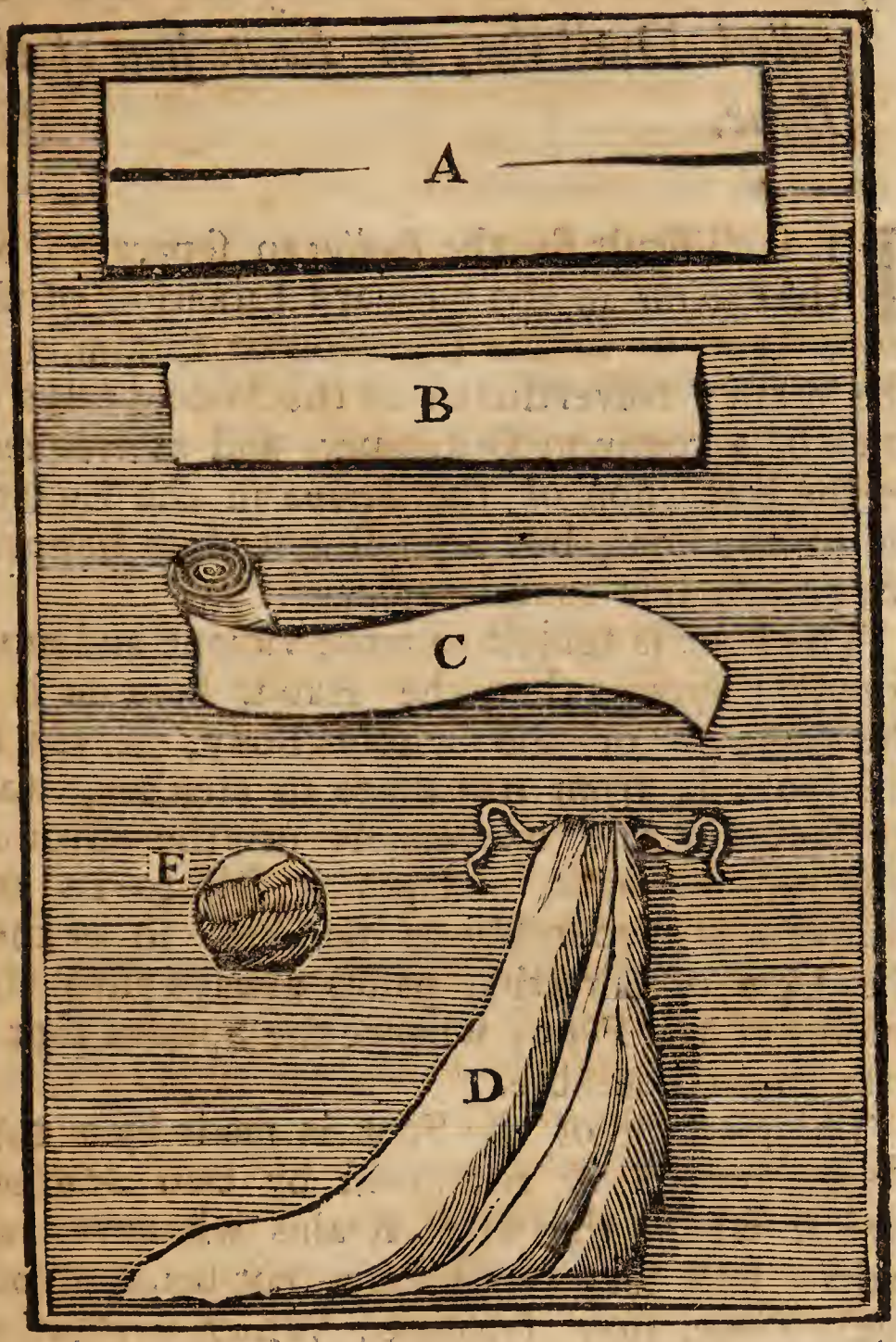
Another. When the Luxation is forwards, they alſo make ſtrong Extenſions, and they bend the Fore-Arm, when the Limb is ſufficiently ſtretched.

Another. If the Luxation is outwards (whilſt the Aſſiſtants are employed in making the Extenſions and Counter-Extenſions) you muſt lay your Hands, the one within, upon that Part of the Articulation that is formed by the *Humerus*, and the other without upon that Part that is formed by the *Radius* and the *Cubitus*, and bringing both Hands together, with a Jerk, the Reduction is made.

Another. When the Luxation is inwards, whilſt the Extenſions are making, one Hand muſt be laid on the inward Part of the Articulation formed by the Bones of the Fore-Arm, and the other without, on that Portion of the Articulation that is formed by the *Humerus*, and by bringing them forcibly near each other the Reduction is made.

Dreſſing. After the Reduction, one puts on all the Sorts of Luxations the Compreſſes marked (AB) in the Figure of the Page following; and they muſt be dipped in camphorated Brandy, if there is an *Ecchymoſis* or *Tromboſis*. This done, the Bandage *Spica* muſt be made with the Roller

Roller (C) and afterwards the Arm muſt be placed in the Scarf (D) with the Pellet (E) in the Hand.



CHAP.

CHAP. IX.

Of the LUXATION *of the* Radius *called* Diaſtaſis, *or Excurſion of the Bone.*

Whether the Diaſtaſis is an eaſy Diſtemper.

IT is difficult for the *Radius* to ſeparate from the *Cubitus* in the outward Luxation of the Fore-Arm, or in the Luxation or ſpraining of the Wriſt: Nevertheleſs all the World talks of it as of a common Diſtemper, and as frequent as the Excurſion of the *Perona* in the Luxation of the Foot, but ſuppoſing it does happen, it is much leſs conſiderable.

Why the Diaſtaſis is more frequent in the Perona.

The Foot is ſubject to more violent and more frequent Sprains than the Hand, becauſe it is the Support of the whole Body, ſerves to tranſport it from one Place to another, and, in Spite of the unevenneſs of the Ground whereon we walk, adapts it ſelf to its unevenneſs as favourably as poſſible, ſo as that the Line of Direction paſſes always thro' the middle of the Foot; whence the Sprains that it gets are conſiderable.

Another Reaſon.

The jointing of the Foot is made by a *Ginglymus*, which is reſtrained by two *Malleoli*, againſt which the Foot ſtrains whenever we make a falſe Step; and they, not being of one ſingle Piece, may ſeparate: Which Separation is call'd *Diaſtaſis*.

Difference in the Wriſt.

'Tis not the ſame in the Wriſt, which is jointed by a *Genu*, and which can turn either in or out without ſtraining contrary to the Bounds of its Articulation, which Bounds are much leſs raiſed than thoſe of the Foot, and have

have leſs hold of the Head of the Bone, and the *Cubitus* belongs not (as one may ſay) to the Articulation, which renders the *Diaſtaſis* yet more difficult; for to cauſe a *Diaſtaſis*, the Eminence of one of the Bones of the Fore-Arm muſt be the Point that ſupports the Head of the Bones of the Wriſt, at the Time that it makes an Effort againſt the Eminence of the other, without which it will not act ſo as to make the Separation.

Continuation.

One may add that the *Muſculus Quadrator Rotundus* oppoſes this Separation; and beſides the inter-oſſal Ligament helps very much to retain the Bones, both in the one and the other Part.

All theſe Reflections made upon the Structure of the Part, not only prove that the *Diaſtaſis* ſeldom happens to the Wriſt, but they perſuade me that 'tis imaginary, and that ordinary Strains cannot cauſe it.

They ſay that it has been ſeen.

There are Surgeons who pretend to have ſeen it. I won't diſpute againſt Matters of Fact, but I may be permitted to doubt of thoſe I have not ſeen; not that I will accuſe thoſe of Impoſition who ſay they have cured the *Diaſtaſis* of the *Radius*, but they may be miſtaken.

How it is poſſible.

I don't ſay that the *Diaſtaſis* is abſolutely impoſſible, if the Cauſe be complicated; for it may happen that a Fall or Blow may have a Combination of ſo many Circumſtances, that the Strain may have a Tendency to retain the *Cubitus* in its Place, and at the ſame Time, and with the ſame Violence, may force the *Radius* from its right Poſition; but it will never happen in an ordinary Strain, Blow or Fall.

Obſervations.

I have been carried to ſee Patients, who they ſaid had the *Diaſtaſis*; there was indeed a great Relaxation in the Joint of the Wriſt, which allowed the *Radius* a Motion, that is not common

mon to it: I was ſenſible of a Noiſe of a gleatous Matter, but found no Separation. Theſe Patients had had Sprains or Luxations of the Wriſt, which had been ſucceeded by a Tumour of the Joint, either by the Swelling of the Parts next the Articulation, or by the Increaſe of the *Sinovia* which had relaxed the Ligaments, and permitted the Separation of the Bones.

This Diſeaſe has no other Dreſſing than that of the Luxation of the Wriſt, which will be found in the ſubſequent Chapter.

CHAP. X.

Of the LUXATION *of the Wriſt.*

Structure THE Wriſt is joined by a *Genu* with the two Bones of the Fore-Arm. This Articulation is one of the moſt curious that is to be ſeen in a human Body. The 2d, 3d and 4th Bone of the *Carpus* or Wriſt, form a round and oblong Head, covered with a poliſhed Cartilage, which is jointed in a pretty ſuperficial Cavity formed by the *Radius*. The *Cubitus* has no Share in this Articulation, altho' it ſeems to have, becauſe the Cartilage that is over the Cavity of the *Radius* is prolonged, and makes an Appendage which covers the End of the *Cubitus*, and places it ſelf between the Bones of the *Carpus*, and the lower Extremity of the *Cubitus*. This Appendage is hollow on the Side of the Wriſt Bones, and is (as one may ſay) a Prolongation of the Cavity of the *Radius*; with-

without it, this Cavity would not be ſufficient to lodge the Head of the Wriſt-Bones.

The Side of the cartilaginous Apendage that is next the *Cubitus*, is alſo hollow, to lodge the the lower End of the *Cubitus*.

Several Ligaments faſten this cartilaginous Appendage to the *Cubitus*, and the Wriſt-Bones: One of them, which faſten it to the *Cubitus*, makes a Sort of Ring, which gives Liberty for the Motion of Pronation and Supination. The Ligaments.

The Flexion and Extenſion of the Hand are more apparent Motions, than thoſe which are made Sideways, becauſe the ſecond Row of Bones of the *Carpus* has a particular Articulation with the firſt; the latter form a Cavity; the former a Head which is jointed therein, and moves very ſenſibly; ſo that the Flexion is made in two Places, viz. at the Junction of the firſt Row of the Wriſt with the *Radius*, and at the Junction of the ſecond Row with the firſt. This Junction is, as well as the other, faſtened by ſeveral very ſtrong Ligaments, which have different Directions, without diminiſhing the Facility of the Muſcles in moving. Movements. Ligaments.

The Muſcles that belong to the various Movements of this Articulation terminate in tendinous Strings, and paſs over the Articulation to the Wriſt-Bones, where they inſert themſelves without being fixed to any Thing whatever, any more than a Cord that paſſes thro' a Pully; they are covered with Sheaths, wherein they ſlip without ſuffering any Friction, becauſe a Liquor like the *Sinovia* of the Articulations, moiſtens and lubricates theſe Sheaths, and the Tendons. Muſcles.

In almoſt all other Articulations the fleſhy Part of the Muſcles paſſes over the Joint; but in the Wriſt and the Foot, there are only Remark.

tendinous Strings. What is very essential to remark, is, that not only the Muscles which belong to the Movement of the Wrist, pass over this Articulation, but also the proper, as well as the common, *Flexors* and *Extensors* of the Fingers.

Kinds. The Wrist may luxate forwards and backwards, that is to say, on the Side to which it bends, and on the Side of its Extension. It also dislocates on the Inside, and on the Outside; that is to say, towards the Thumb, and towards the little Finger.

Remark. The Luxations before and behind are the most common, for I believe the others very rare, at least they are more difficult, because the Eminences of the *Cubitus* and *Radius*, which serve as Limits, or (if I may venture to say so) as *Malleoli*, or Ankles, as in the Articulation of the Foot) are so narrow and so pointed, that when the Wrist is forced outwards, it cannot rest upon them, and is obliged to slip forwards or backwards; in like Manner if it is carried inwards, it will be obliged to slip before or behind, the pointed Eminence of the *Cubitus* inclines it to fall so.

Remark. In all Falls the Palm of the Hand seems to go before us, as it were to defend us from its ill Effects: In this Case if the Hand luxates, it turns to the Side of the Extension, and the Head of the Wrist-Bones falls on the Side of the Flexion.

Remark. When one falls on the back of the Hand, and the Wrist dislocates, the Hand remains turned on the Side of the Flexion, because the Head of the Wrist-Bones falls on the Side of the Extension; so that 'tis uncommon in Luxations of the Wrist for the Hand to be turned towards the Thumb, or the little Finger.

When

When the Wriſt is diſlocated inwards, I mean towards the Thumb, one finds an Eminence towards the *Radius*, the Hand is turned outwards towards the *Cubitus*, the Fingers can neither bend nor extend themſelves without great Pain, which is cauſed by the *Flexors* and the *Extenſors* being equally ſtretched, being alike diſtant from their Origin. The Hand is turned outwards, becauſe the *Cubitæus internus* and *externus* are extended. Signs.

The Patient is in Pain when his Wriſt is turned outwards, and he is relieved if his Hand is brought near the *Cubitus*; becauſe it eaſes the Muſcles whereof we have been ſpeaking, by putting them in a more tolerable Degree of Tenſion. Signs.

The Pronation and Supination are made with Pain, becauſe it is impoſſible to make thoſe Movements without the Hands following, which gives it Shocks that irritate the Muſcles and Ligaments which are in a great Tenſion. Signs.

The Pain which the Patient ſuffers is always felt the whole Length of the *Cubitus* to the internal *Condyle* of the *Humerus*; becauſe the *Cubitæus internus & externus*, which are ſtretched in this Luxation, are faſtened all along the *Cubitus*, from the *Condylus internus* to the Wriſt. Signs.

When the Luxation is outwards, I mean towards the little Finger, the End of the Hand is turned towards the Thumb, and the Head of the Wriſt-Bones faces the little Finger; which is cauſed by the *Radiæus internus*, the *longus & brevis* which are in Contraction. Signs.

The Fingers can neither bend nor extend themſelves without Pain, by Reaſon of the Tenſion both of the *Muſculi Flexores & Extenſores*.

Signs. The Patient is in Pain when his Hand is turned towards his Thumb, becauſe it extends the Muſcles already ſtretched; and he finds Relief when one turns it towards the little Finger, becauſe it relaxes thoſe very Muſcles.

In Pronation and Supination (as in all the other Motions which put the Patient to Pain) the Anguiſh is always felt from the Wriſt to the external *Condyle*; for 'tis in this Compaſs that the *Radiæi externi*, the *longus & brevis* (which are called together *Radiæus externus*, or *Bicornis*) are lodged and have their Riſe. This Pain is alſo felt in the Fore-part of the *Condylus internus*, becauſe the *Radiæus internus* which takes its Origin there, is extended like the others.

Signs. If the Wriſt is luxated on the Side of the Extenſion, there will be an Eminence on the Side of the Flexion, and a Cavity on the other. The Eminence proceeds from the Head's being forced thither, whence a Hollowneſs is found at the Place from whence it has iſſued.

Explication. The Wriſt is forced on the Side of the Flexion, and the End of the Hand on that of the Extenſion, becauſe the *Extenſors*, which are ſtretched, draw on that Side.

Explication. The Fingers are bent, and can't be extended, becauſe the Head of the Wriſt-Bones thruſts the Tendons of the *Sublimis* and the *Profundus* inwards; which conſiderably removes their Origin from their Inſertion.

It cauſes great Anguiſh when one bends the Wriſt, becauſe it ſtretches the *Extenſors* which are in a conſiderable Tenſion.

Sequel. The Pronation and Supination are yet more difficult and painful than in the foregoing Luxation, becauſe the Head of the Wriſt-Bones are

are preciſely in the Place where the Movement of the *Radius* with the *Cubitus* is made.

The Pain is felt all over the Fore-Arm to the two *Condyles*, becauſe the Muſcles that are ſtretched on both Sides, have their Faſtenings at the two Condyles of the *Humerus*. Sequel.

The Signs that the Luxation of the Wriſt is on the Side of the Flexion, are, that there is an Eminence on the Side of the Extenſion, and a Hollowneſs on that of the Flexion; tho' the one and the other are leſs apparent than in the Luxation aforegoing. Signs.

The Wriſt is forced on the Side of the Extenſion, and the Hand is turned on the Side of the Flexion, becauſe the *Flexors* of the Wriſt are more ſtretched than the *Extenſors*. Explication.

The Fingers are extended, and one can't bend them without Pain, becauſe the Head of the diſlocated Bones thruſts and preſſes the Tendons of the common and four proper *Extenſors*. Sequel.

It puts the Patient in great Pain to extend the Wriſt, becauſe the *Radiæus & Cubitæus internus* which are in a great Tenſion, are yet more violently ſtretched when one would extend the Wriſt. There is the ſame Difficulty of Pronation and Supination, as in the preceding Luxations. Sequel.

The Pain extends all over the Fore-Arm to the external and internal *Condyle*, becauſe the Muſcles that are ſtretched are on both Sides the Fore-Arm, and are faſtened to the two *Condyles*. Sequel.

Of the Prognoſtick and Accidents that attend, or may follow theſe Luxations.

The Luxation of the Wriſt is one of the moſt Melancholy, both by Reaſon of its extraordi- Prognoſtick.

nary Pain, the Difficulty of reducing it, the Inflamation that follows it, the Swelling of the Part by the Inflammation, the Defluxion and Impoſthumes of glearous Matter, and laſtly, becauſe it is long in curing, and there often remains a periodical Pain, a Difficulty of moving it, and ſometimes an *Anchiloſis*, on Account of the Glears that diffuſe themſelves and coagulate in the Articulation, in the Sheaths of the Tendons, and other neighbouring Parts.

Explication. It is eaſy to explain all theſe melancholy Accidents, when one reflects on what we have ſaid of the Structure at the Beginning of the Chapter, and in the Account of Luxations in general.

Explanation. Every Time there happens to be a Sprain or Luxation in the Wriſt, there does not only happen a diſplacing of the Bones, but alſo every Tendon is, as it were, diſplaced; their Sheaths being removed, and extraordinarily ſtretched, and the Spring of the *Sinovia* compreſſed; this Liquor flows into the Sheath, and removes it yet more, it compreſſes the Tendons, and they can't ſlip into their Sheaths to make their Movements, or if they do, 'tis with Difficulty, and acute Pains; cauſed not only by the Tenſion which this Matter occaſions in the Sheath, but alſo by the Compreſſion that the Matter and Reſiſtance of the Sheath cauſes in the Tendons.

In the End this Matter coagulates or is corrupted, either by its own ill Quality, by the Fault of the Patient, or that of the Surgeon.

Obſervation. If the *Sinovia* coagulates, it renders the Joint ſtiff, and ſometimes produces an *Anchiloſis*; and if 'tis corrupted, it cauſes Abſceſſes that are very hard to cure, and very often terminate in

Fiſtu-

Fiſtula's with a *Caries* and Putrefactions, which generally end in Amputation.

Theſe Accidents may alſo come thro' the Fault of the Patient, who obſerves no Regimen; and they happen thro' that of the Surgeon, if he applies oily Medicines that cauſe an Inflammation, or too ſpirituous ones which coagulate the *Sinovia*; or, in ſhort, by having neglected Bleeding.

I can't forbear taking Notice here of a Fault into which they fall, who have not practiſed much; they believe that they muſt not bleed if the Fever, the Pain, or Inflammation don't induce them to it; but they don't reflect that when the Reduction is made, the Pain may ceaſe without the firſt Cauſes of the Inflammation, the Fever, or the Return of the Pain's being removed; foraſmuch as, in the Luxation we are treating of, the Sheaths and Tendons themſelves have ſuffered more in Proportion than the reſt of the Articulation, the *Sinovia* has diffuſed it ſelf over the Sheaths of the Tendons in great Quantity; and the Glands, which ſerve to abſorb the Liquor, have no longer Power to ſuck it back, on Account of their ſwelling; and therefore, tho' there be no more Pain, one muſt bleed, to empty the Blood Veſſels that feed the Parts of theſe Joints, and thereby cauſe the Arteries (by their not being ſo full) to furniſh *Sinovia*, and enable the Veins, by being evacuated, to receive with more eaſe the *Sinovia* of the lymphatick Veſſels, to the clearing of which their fullneſs is an Impediment. Reflections. Reaſons for bleeding.

After what has been ſaid, we ought to reflect upon two Things. Firſt, that only Tendons paſs over the Joint; and Secondly, that not only thoſe which belong to the Movement of Reflection.

the Hand, pass thereby, but also those which move the Fingers; so that these Dislocations must be more dangerous.

There is not here as in the Arm, a *Deltoides* and a *Pectoral*, nor as in the Thigh, *Glutæus*'s and *Triceps*'s, whose fleshy Bodies, which are immediately at the Place of their Junction, resist more and with much less Pain, than all the Tendons of the Hand, since the Flesh of the Muscles is infinitely less sensible than the Texture of the Tendons. I will add some Aphorisms to finish the Prognostick.

First Aphorism. The Wrist is easily reduced when the Luxation is incompleat, and the Disjointing is between the first Row and the *Radius*.

Observation.

Second Aphorism. There are Luxations of the Wrist, which can never be set, when the Articulation of the first Row has dislocated from the second. It is hard to make the Reduction, because to succeed, the Effort must be made upon the Bones that are luxated, and not upon those next to them. Now the first Row has not Compass enough to be taken hold of, and grasped by the Hands that make the Counter-Extension; one is obliged to pull the lower End of the Bones of the Fore-Arm, whence one Part of the Strength is lost on the Articulation of the first Row with the *Radius*; the Remainder has not Power enough to separate the second Row from the first, to disengage the Bones and replace them.

Third Aphorism. Altho' the Reduction be well made, there remains a long Time a Difficulty in moving the Wrist and the Fingers; the Redundance of the *Sinovia* has (as one may say) drowned all the Places where it did good Offices by its unctuous Quality, and its due

Quan-

Quantity; and it requires a conſiderable Time before this Liquor re-enters within its Bounds, or the Places overflowed are dried up; at the End of which, the Movements are yet difficult, and the Tendons don't ſlip in their Sheath but with a great deal of Trouble.

Fourth Aphoriſm. The Pronation and Supination are difficult, and made with Pain. The *Radius*, which makes by it ſelf the Junction with the Wriſt, ought, one would think, to move over the *Cubitus*, and carry the Hand without Pain from Pronation to Supination, and from Supination to Pronation: But (as has been ſaid) the Cartilage, that covers the Cavity of the *Cubitus*, makes an Appendage, which extending it ſelf between the *Cubitus* and the Bones of the Wriſt, finiſhes the Cavity that contains the Head of the Bones of the firſt Row, and forms alſo the Socket that lodges the Eminence of the *Cubitus*, over which the *Radius* rolls in Pronation and Supination. Now this Cartilage, and the Ligaments which ſerve it as faſtenings, are ſwelled and in Pain, whence the Movements of the *Radius* over the *Cubitus* for Pronation and Supination, can't be made without Anguiſh.

Fifth Aphoriſm. Altho' the Wriſt may be well ſet, there will appear a long Time after its Cure a Deformity at the *Cubitus*, and an Elevation of its Eminence near the Wriſt, which makes the Patient, and ignorant Perſons believe, that the Reduction has not been well made. The Bone-Setters take Advantage of this falſe Idea of the Patients, to make themſelves eſteemed, ſome ſaying that there is a Fracture, others cry a *Diaſtaſis*, and ſome pretend that the Bones are disjointed, and ſet themſelves about curing them by fraudulent Ope-

Knavery of Bone-Setters.

Operations, to which the credulous People fall a Victim, and are the Bubbles; but let them know that this deformed and apparent Blemish is the natural Consequence of their Disease.

Remark. The deformed Swelling or Tumour that appears, is only the œdematous swelling of the Fat that covers the *Musculus Quadratus* as far as its Origin at the *Cubitus* under the Passage of the *Cubitæus internus*; and the Eminence of the *Cubitus*, near the Wrist, is nothing but the natural Eminence of that Bone which appears more raised, both because it is thrust a little outwards by the *Sinovia* of its Articulation with the *Radius*, and by the Swelling of ligamentous Covers that wrap round it.

Of the Cure.

To make the Reduction. The Extensions and Counter-Extensions seem easy, because there is hold enough on the Hand Side to make the one, and towards the Fore-Arm for the other. One must place some strong Person towards the Fore-Arm, who must grasp it with both Hands 3 or 4 Fingers Breadth from the Joint: Another yet stronger must take hold of the *Metacarpus* as near the *Carpus* as possible. The Surgeon must make them pull at first softly, then increase by Degrees till the Extension is sufficient, then the Wrist will sometimes reduce of it self, without one's being obliged to do any Thing else: At other Times it is requisite to direct the Person who pulls the Hand, how to move, and to work ones self to guide the Head into its Socket, so that if the Bone is luxated on the Side of the Flexion, the Person who pulls the Hand must be ordered to thrust it on the Side of the Flexion, whilst the Surgeon favours this Motion

on with both Hands, by inclining the Wriſt to throw it ſelf on the Side of the Extenſion.

If the Wriſt be luxated on the Side of the Extenſion, one muſt cauſe him to make a contrary Motion; and by a contrary Operation one muſt puſh the Wriſt on the Side of the Flexion.

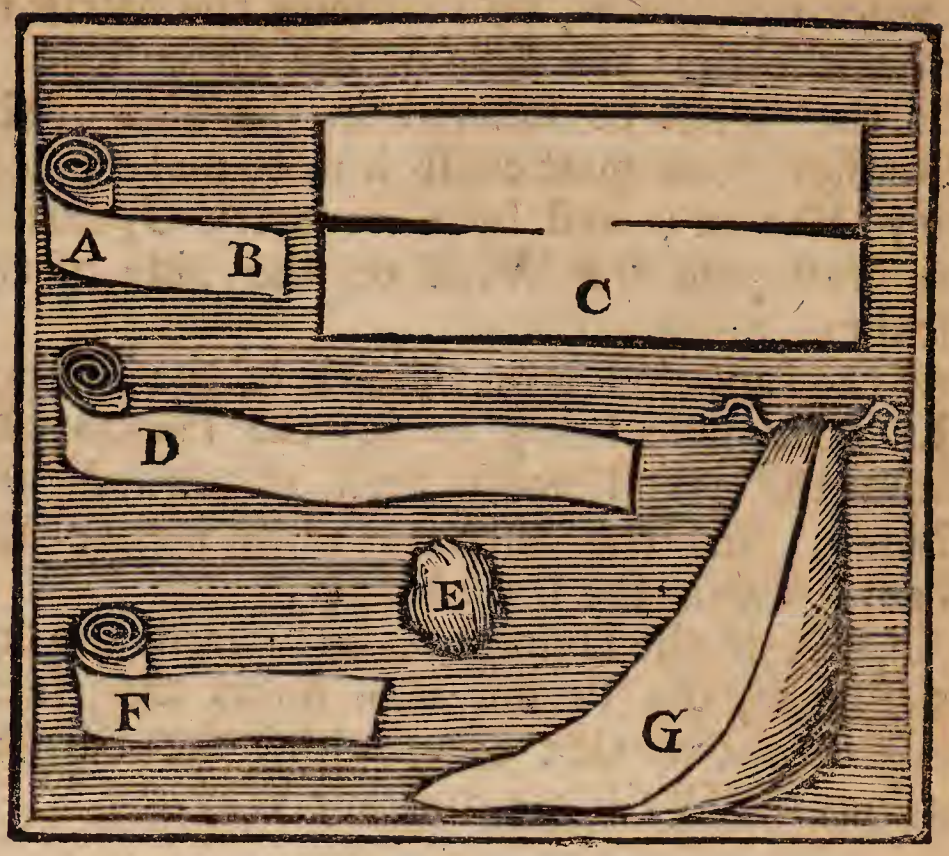
If the Luxation is on the Side of the Thumb, (the Extenſions being made) the Perſon who draws the Hand muſt turn it towards the Thumb, and the Surgeon muſt incline the Wriſt towards the little Finger.

In fine, if the Diſlocation be towards the little Finger, the Perſon who holds the Hand, muſt turn it on that Side, whilſt the Surgeon inclines the Wriſt the contrary Way.

Dreſſings.

The Compreſs (A) muſt be laid upon the Articulation, taking up the lower Part of the Fore-Arm, and a great Share of the upper Part of the Hand. In beginning to put it on, the Thumb muſt be thruſt into its Hole (B) then one muſt draw the Compreſs round the Wriſt, lay over it the Bolſter (C) and apply thereupon the Roller (D) two Ells and a half long, and two Fingers broad; it muſt make a Figure of 8, whereof the Croſſing in *Spica* muſt always be where the Bone was whil'ſt diſplaced; *viz.* on the Side of the Extenſion, of the Flexion, of the Abduction or Adduction, which are the four different Sides whereon the Wriſt can luxate: The reſt of this Roller muſt be rolled in Circles, ſome above the Articulation, and others beneath.

One



One muſt fill the Palm of the Hand with the Pellet (E) made of Linnen pretty large and ſoft, it muſt be kept on by a Compreſs, as the whole muſt be by the Roller (F) of an Ell and a half long, and two large Fingers broad. All the Compreſſes, Rollers and Pellets muſt be dipt in good aromatick or camphorated Brandy.

The Arm muſt be put in the Scarf (G) as it has been deſcribed in the Luxation of the Arm.

The Regimen, Bleedings, and general Remedies muſt be obſerved, as has been mentioned in other Luxations.

CHAP.

CHAP. XI.

Of the LUXATION *of the Thumb and other Fingers.*

THE Fingers have their first *Phalanx* articulated with the Bones of the *Metacarpus* by a *Genou*, the other *Phalanges* are jointed by a *Ginglymus*. The first *Phalanx* of the Thumb is jointed by a *Genou* with the fifth Bone of the *Carpus*, it is jointed by a like Articulation with the second *Phalanx*, which is jointed by a *Ginglymus* with the last. 'Tis known that all these Jointings are moved by the Tendons of the *Sublimis* and the *Profundus*, by the proper *Flexor* of the Thumb, by the *Lumbricales*, and by the *Extensors* both proper and common; to which must be added the *Interossei*, the *Thenar*, the *Antithenar*, the *Hippothenar*, the *Antihypothenar*, and the *Adductor Indicis*. 'Tis remarkable that only Tendons pass over those *Phalanges* that are jointed by *Ginglymus*, and that over those that are jointed by *Genuox*, there pass musculous Bodies: The latter are the first of each of the four Fingers, as well as the first and second of the Thumb; they are much more susceptible of Luxation than the others, for Reasons that I have laid down in general. Structure. Structure.

The Thumb, as well as the other Fingers, may luxate on the Side of the Flexion, and of the Extension, inwards and outwards. The Dislocation is easier made on the Side of the Flexion than of the Extension: The two lateral Luxations are yet more difficult. When the first *Phalanx* of the Thumb is dislocated on Kinds.

the

Side of the Flexion, the Thumb is ſtretched out, and the Tendons that extend it ſally outwards.

Signs. When the Luxation is on the Side of the Extenſion, it is bent, and there appears an Eminence outwards, and its Extremity turns towards the Body when it is outwards, and on the contrary it inclines towards the other Fingers, when this *Phalanx* is diſlocated inwards, that is towards the Body.

Signs. The 2d *Phalanx* when luxated, gives almoſt the ſame Signs; but as its Articulation is leſs cover'd with Muſcles, it is eaſily known by the Touch, and no Body can be miſtaken therein.

Signs. The Diſlocation of the firſt *Phalanges* of the other Fingers is almoſt like that of the 2d of the Thumb.

The Luxations of the *Phalanges* jointed by *Ginglymus*, are ſo eaſily known at Sight, and by the Touch, that I need not give any Sign to judge of them.

Cauſes. The Cauſes are Falls, Blows, and Strains, or the Fingers being taken or lock'd in any Thing.

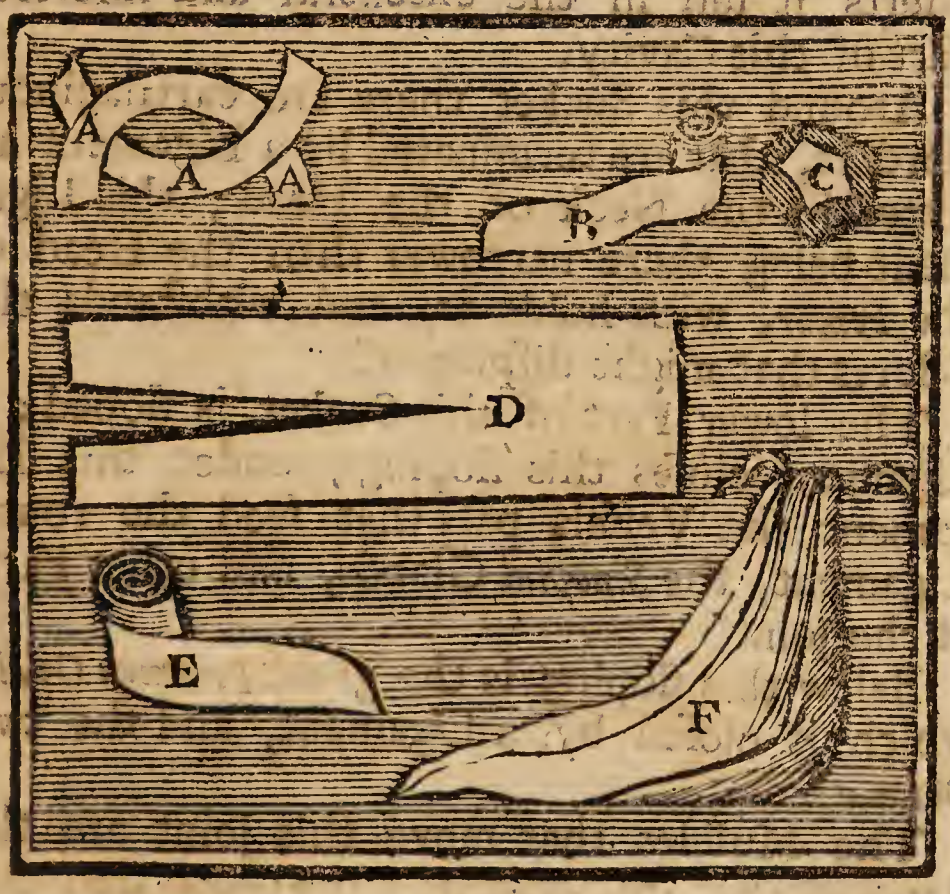
Prognoſtick.

Prognoſtick. The firſt *Phalanges* are more eaſily diſlocated and ſet than the others; the firſt *Phalanx* of the Thumb has nevertheleſs ſome Difficulty, as being hid by the *Thenar*, *Antithenar*, and the *Adductor Indicis*, and what is more, one cannot eaſily make the Extenſions. The laſt *Phalanges* being luxated are hard to replace, becauſe one has no hold of them, they are ſo ſhort that one cannot without Difficulty keep ones Graſp. I would not adviſe the putting in Practiſe what was ſaid in publick by a Man who always propoſes Methods ſuitable to his Ruſticity. "To

"make

" make the Extenſion in theſe Caſes, I make " no Difficulty (ſays he) of taking hold of the " luxated *Phalanx* with a pair of Pincers, and I " pull it ſtrongly till 'tis replaced." Such an Author ſometimes deſerves richly to have his Fingers Ends pinched.

When the Luxation is reduced, there muſt be laid on two little croſs Compreſſes (AAA) ſteept in Brandy, then a Bandage muſt be made with the Roller (B) *viz.* a *Spica* for the Luxation of the *Phalanges* of the Thumb, or for the firſt *Phalanges* of the other Fingers; and for the others a circular one. One muſt put into the Hand the Pellet (C) whereupon the Fingers muſt be placed in a middling Flexion: The Hand muſt be again covered and wrapt in the Compreſs (D) and the Roller (E) then the Scarf (F) muſt be made as uſual. The Cure is continued as in other Luxations.



CHAP.

CHAP. XII.

Of the LUXATION *of the Thigh.*

Structure THE Articulation of the Thigh-Bone with thoſe of the Hips, is by a *Genou*. The Head of the *Femur* is very large and ſmooth, and poliſhed, on Account of the Cartilage that covers it; the Cavity of the *Iſchium* is deep, and alſo covered with a Cartilage which poliſhes it like the Head that it receives; at leaſt both the one and the other have this Smoothneſs at the Places of their Friction, which is all over, except the Faſtenings of the round Ligament, which takes its Origin from this Head, a little lower than the Center, and inſerts it ſelf in the excentral and inferiour Part of this Cavity.

Around this Socket there are cartilaginous Borders, that are terminated by a Ligament inſerted in the Neck of the Head; this Ligament being there narrower than the Head of the *Femur*, with-holds it, and withſtands the Efforts that might diſplace it.

The lower Part of this Socket is ſloped; a Ligament cloſes this ſloping; under this Ligament the Veſſels paſs that feed the round Ligament, the *Sinovial* Glands, and other Parts of the Joint.

Below this ſloping is the great *Foramen Ovale*, which is cloſed by a Ligament, and the two *Obturators*.

Structure The Muſcles that move this Joint are the ſtrongeſt that are, eſpecially the *Glutæi* that carry the Thigh behind and before.

The

The *Triceps* that draws it inwards is pretty conſiderable; and if the *Pſoas*, the *Iliacus*, and *Pectineus* have not ſo much Force in Appearance; their Situation, and their Paſſage over the *Os Pubis* is a Help to their Action, and makes them bend the Thigh with a great deal of Vigour.

The Arch of the Muſcles of the *Abdomen* gives Paſſage to them with the Blood, the nervous, and lymphatick Veſſels, which go to make what is called the String of the crural Veſſels.

The *Muſculus Quadratus*, the *Pyriformis*, the *Obturatores*, and the two *Gemini*, have alſo great Force by their advantagious Situation, and becauſe they are ſhort; theſe laſt five form an *Aponeuroſis*, which is inſerted in the Cavity of the great *Trochanter*.

Of all the Jointings by *Genou*, that of the Thigh is the moſt difficult to luxate. The Thigh hard to luxate.

1. Becauſe the Head of the *Femur* is very large, and the Cavity of the *Iſchium* is very deep; wherefore the Strain that forces it from its Place muſt be very violent.

2. There is no Part where the Muſcles are ſtronger, and more numerous than here; and becauſe the Muſcles ſerve to keep the Bones in their Places, as has been often ſaid, there requires a greater Force to diſlocate this Bone, than thoſe where the Muſcles are weaker.

3. There is a cartilaginous Border that adds to the Hollow of the Cavity, and this Border is form'd in ſuch a Manner, that the Side which is moſt ſtrait is againſt that Part of the Head that is ſtraiteſt, which is that which faces the Neck; the broadeſt is on the Side of the Cavity, and thus it encloſes it below the Axis of the Head. It is eaſy to conceive that by this Mechaniſm, the Thigh that is firm in its Joint is extraordinary hard to luxate.

4. There is a round Ligament which oppoſes the Luxation: This takes its Riſe from the Head of the *Femur*, and inſerts it ſelf in the Cavity of the *Iſchion*; it is not, indeed, faſten'd directly in the Center of the Cavity, nor in the middle of the Head, whence it cannot reſiſt againſt all Sorts of Luxations, as ſhall be ſhown in treating of their different Kinds.

5. Altho' there are very ſtrong and many Muſcles, it has not ſo free a Motion as the Arm; and we have ſaid that the Joints, whoſe Motions were greateſt and moſt apparent, diſlocated with more Eaſe than the others, becauſe their Articulations are leſs compleat. Theſe are the Reaſons why the Thigh is more difficult to luxate than the other Joints.

Of the Kinds and Difference.

Eaſieſt Luxation. The Thigh diſlocates upwards and inwards, upwards and outwards, downwards and inwards, downwards and outwards.

The Luxation downwards and inwards is moſt eaſy.

1. Becauſe the Cavity of the *Iſchion* is not ſo deep on that Side, as on all the others.

2. There is a ſloping that is only cloſed by one Ligament, which leaves (as one may ſay) a Breach that facilitates the iſſuing out of the Thigh-Bone on the Side of the *Foramen Ovale*.

3. The round Ligament that retains the Head of the Bone, is neareſt the internal Side of the Cavity, whence the Head may remove farther on that Side than any other, without the Oppoſition of this Ligament.

4. The ſtrongeſt Muſcles are ſituated outwards, and upwards, ſo that the weakeſt are on the lower and inner Side, whence the Thigh

Bone

Bone has fewer Impediments to conquer on that Side, than any where elſe.

The Luxations upwards are more difficult: A more difficult Luxation. Firſt, becauſe the Head of the Bone (on Account of the Obliquity of the Cavity that receives it, and of the Neck that ſupports it) can more eaſily reſiſt the Strains that thruſt the Bone on that Side.

2. It luxates more difficultly upwards and outwards, on Account of the Height of the Border of the Cavity, which is an almoſt invincible Obſtacle.

4. The *Glutæus major, medius & minimus*, are the ſtrong Muſcles that oppoſe this Luxation, and do with Reſpect to this Luxation what the *Deltoides* does in Regard to that of the Arm.

The Luxation downwards and backwards is the moſt difficult of all, becauſe the Muſcles always have a Tendency to draw the Thigh upwards and outwards; and beſides the Border of the Cavity has no Breach on that Side, as it has inwards: I even believe that all the Luxations downwards happen downwards and inwards; the Bone placing it ſelf on the *Foramen Ovale*, it is impoſſible, I think, that the Head of the *Femur* ſhould reſt upon the *Os Iſchion*. The moſt difficult Luxation.

There are a great Many who believe that all the Luxations happen thro' the ſloping, and that the Fall, being complicated or followed by ſome extraordinary Motion, inclines the Head of the Bone to take one of the other Poſitions.

Signs.

The Signs of the Luxation upwards and inwards, are.

1. That the Thigh is ſhorter.

2. That the great *Trochanter* is raiſed higher, and the Buttock ſinks in.

3. The Knee, the Leg, and the Foot turn a little outwards.

4. The Thigh is a little ſtretched.

5. The Thigh can't bend without great Pain.

6. There is a great Tumour on the *Os Pubis*.

7. The *Scrotum* ſwells.

8. The whole Thigh is choaked up, and benumm'd, and ſome Authors ſay that there follows a Stoppage of Urine.

Explication.

First and 2d Explication. The Thigh is ſhorter, becauſe it is mounted upwards, and the great *Trochanter* is raiſed on the ſame Account.

Third. The Knee and Foot are turned a little out, becauſe the *Obturators* are ſtretched.

Fourth. The Thigh is a little extended, becauſe the Muſcles are in Contraction, and the *Pſoas*, *Iliacus* and *Pectineus* are relaxed.

Fifth. The Thigh can't bend without great Pain, becauſe the *Glutæi* are too much ſtretch'd; and alſo becauſe of the Head of the *Femur*'s compreſſing the crural Veſſels.

Sixth. The Tumour over the *Os Pubis* is made by the Head of the Bone which is over it.

Seventh. The *Scrotum* ſwells, by Reaſon of the Compreſſion of the Spermatick Veſſels.

Eighth. The Thigh Swells and is benumm'd by the Compreſſion of the crural Veins, Arteries and Nerves.

The Signs that the Luxation is upwards, and outwards, are:

Signs.

1. That the Thigh is ſhorter.
2. There is a Swelling outwards.
3. The Thigh, Knee and Foot are turned inwards.
4. The Thigh may be moved inwards, but not outwards without great Pain.
5. The End of the Foot reſts upon the Ground.
6. The bending of the Buttock is higher.
7. The internal Muſcles are ſtretched, as if there were a Cord from the *Pubis* to the middle of the Thigh.

Explication.

Explanation.

1. The Thigh is ſhorter, becauſe the Bone is got upwards.
2. The Tumour or Bunch outwards is cauſed by the disjointed Bone.
3. The Thigh, Knee and Foot turn inwards, becauſe the *Glutæi* are relaxed, and the *Triceps*'s are contracted.
4. The Thigh may be moved inwards, but not outwards without Pain, becauſe the *Triceps*'s are too ſtretch'd.
5. The End of the Foot reſts upon the Ground, becauſe the Thigh being ſhortened, the Patient to ſupply the Defect, endeavours to render it longer by extending the Foot.
6. The bending of the Buttock is higher, becauſe the Thigh is mounted up.
7. The Cord that is felt from the *Pubis* to the middle Part of the Thigh, proceeds from the *Triceps*'s being in a great Tenſion.

The Signs that the Luxation is downwards and internal, are.

Signs. 1. That the Head of the *Femur* is on the *Foramen Ovale.*

2. That the Thigh affected is longer than the ſound one.

3. The Ends of the Foot and Knee are turn'd outwards.

4. The Thigh can't move inwards without Anguiſh.

5. There ſeems to be a Cavity in the Buttock, at leaſt it ſinks in.

6. There is an Eminence under the Groin.

7. The bending of the Buttock is lower on the Side that is indiſpoſed, than on that which is ſound.

8. When one ſets the Patient upon his Feet, his Heels, and the Ends of both his Feet being upon the ſame Lines, 'twill be obſerved that when the ſound Leg is ſtrait, the other will be bent at the Knee.

9. The Patient walks as if he were mowing, that is to ſay, that the Thigh, the Leg, and the Foot deſcribe a Semi-Circle.

10. The Patient ſets the whole Sole of his Foot to the Ground at the ſame time, from his Toes to his Heels.

Explication.

Explanation. 1. The Head of the *Femur* is on the *Foramen Ovale*, becauſe the Thigh being luxated inwards, the Head of the Bone can't find a Place better diſpoſed to receive it: This Hole forming (as one may ſay) a Socket. Experience has ſhown it in thoſe in whom the Reduction has never been

been made, becauſe they walk and reſt upon their Thigh, almoſt as firmly as if the Bone were in its proper Cavity.

2. The Thigh affected is longer than the ſound one, becauſe the oval Hole, where the Head of the Bone is, is lower than the Cavity of the *Iſchion*.

3. The Foot and the Knee turn outwards, becauſe the Thigh being diſlocated inwards, is drawn on the contrary Side by the *Glutæi*; and the Leg and Foot which are joined to it, muſt follow and turn on the ſame Side,

4. The Thigh can't move inwards without Pain, becauſe then one draws the *Glutæi* violently, which are in Contraction; beſides the Head of the *Femur* bears roughly upon the *Obturator externus*, which bruiſes it, and increaſes the Anguiſh.

5. There ſeems to be a Hollowneſs in the Buttock, or at leaſt it ſinks in, becauſe the great *Trochanter* which has followed the Head of the *Femur*, is forced inwards, and no longer makes a Protuberance outwards as in its natural State.

6. The Tumour that is beneath the Groin, is form'd by the Head of the *Femur*, which is then upon the *Foramen Ovale*.

7. The bending of the Buttock is lower on the Side that is indiſpoſed, than on the ſound one, becauſe the Thigh is lower, which makes the whole Buttock come down, and conſequently the bending,

8. When one ſets the Patient upon his Feet, the Leg can't make it ſelf even with the ſound one, without bending it ſelf, becauſe it is longer than the ſound one; whence if the Patient would ſtretch it out, he carries it forwards, or throws it aſide.

9. The Patient walks as if he was mowing, and the Thigh makes a Semi-Circle, becauſe being longer, the Patient can't carry it forwards in a ſtrait Line, when he walks, but in a Curve; foraſmuch as the ſound Thigh can't raiſe the Body ſufficiently to let the indiſpoſed Thigh move forwards without touching the Ground; which nevertheleſs is abſolutely neceſſary, that one may walk eaſily.

10. The Patient ſets his Sole to the Ground all at a Time, from the Toes to the Heel, becauſe the Thigh is too long, and would be much more ſo if the End of the Foot or the Heel reſted upon the Ground: 'Tis for this Reaſon that they who have the Palſy, walk with yet more Difficulty, becauſe their Leg hangs and trails upon the Ground.

Of the Prognoſtick.

All the Luxations of the Thigh are fatal; but ſome are more ſo than others: The leaſt dangerous is that which is upon the *Foramen Ovale*, wherein the Head of the Bone lodges. It is nevertheleſe moſt difficult to reduce, but whether it be reduced or no, it is always leſs dangerous than the others; for altho' one can't reduce the Bone, the Patient for all that, can ſometimes make uſe of his Thigh to walk on, and he is almoſt always unable to uſe it when one don't reduce the other Luxations. This proceeds from the Head of the Bone's agreeing ſo well with the *Foramen Ovale*, that in Proceſs of Time it moves there with almoſt as much Eaſe, as it did before in the Cavity of the *Iſchion*: There have even been ſome ſeen where it had made it ſelf Borders as ſtrong as thoſe of the Cavity of the *Iſchion*.

Obſervation.

This

This may ſerve to prove what I have ſaid in treating of the luxated and fractured Arm, when I propoſed to reduce the *Humerus* after two or three Months Luxation; for it is eaſier for the Head of the Arm to replace it ſelf in a Place where it has already been, and which is made for it, than it is for that of the Thigh to lodge it ſelf in the oval Hole, where it has never been, and where it ought to be looked upon as a ſtrange Tenant. Obſervations.

When I ſaid that the Patient can walk, I did not mean that it was with the ſame Eaſe, becauſe he muſt neceſſarily limp, and have all the Accidents of a luxated Thigh, except the Pain, which he has not always; but he makes a Shift to walk; and in the other Sort of Diſlocations, where the Head of the Bone is not upon the oval Hole, it is moſt commonly impoſſible for him to ſupport himſelf: Beſides, thoſe are dangerous after the Reduction, and this hardly is at all ſo; this proceeds from the round Ligament's being ſtretch'd, torn and broken in all other Luxations, but that which is upon the *Foramen Ovale*; becauſe in this latter, the Bone removing at a leſs Diſtance from its Cavity, the round Ligament, far from breaking, is leſs extended, which is becauſe it is faſten'd below the Center of the Cavity of the *Iſchium*, towards the Bottom, and near the Side that faces the *Foramen Ovale*; this Origin gives the Head of the Bone more Liberty to iſſue out on that Side without breaking this Ligament. Remark. Remark.

The moſt dangerous of all Luxations of the Thigh, is that which is upon the *Os Pubis*, becauſe it compreſſes the Veſſels, whence great Accidents happen, as may be judged by the Signs that I have deſcribed; and this as well as the other that happen upwards or outwards On the Os Pubis very dangerous.

is

is dangerous, becauſe of the Rupture of the round Ligament; for which Reaſon in theſe Sorts of Luxations, the Patient muſt be kept more quiet than in the others, and tighter Dreſſings be applied, till ſuch time as the round Ligament is re-united, which is not always.

Remark. When the Luxation of the Thigh is not reduced in 24 Hours, one runs a Riſque of the Bones iſſuing again out of its Cavity, a little after 'tis replaced.

A Caſe to be obſerved. It is always good to try to reduce it, tho' the Bone has been long luxated, provided the Cauſe be external; for when it is internal, 'twill not ſucceed.

There is ſtill another Caſe wherein 'tis almoſt impoſſible to ſucceed, altho' the Cauſe ſeems external; 'tis when the Diſlocation happens a long time after a Fall upon the great *Trochanter*; and, as it ſeems of Importance to treat fully of this particular Kind of Luxation, whereof no Author has made mention, I will give an Idea of it in the following Obſervation, after which we will ſpeak of the Cure of all Luxations of the Thigh.

Obſervations.

A very particular Luxation. 'Tis ſome Years ſince I was called to ſee a Lady, who for two Months after a Fall, had complained of a rheumatick Pain, that had ſeized upon her Hip, and her whole Thigh. At the Recital that was made me of her Fall, and the Circumſtances that attended it; I was prepoſſeſſed, even without touching her, with an Opinion that the Thigh was diſlocated upwards and outwards; nevertheleſs before I told her Ail, I examin'd her, and found all the Signs that denote this Luxation.

I then

I then declared to her that her Thigh was disjointed. The Aſſiſtants blam'd the Surgeon who had her under Cure, becauſe he had not diſcover'd this Diſlocation. I inform'd them that they blam'd him wrongfully, becauſe he had not ſeen the Patient but the 3 or 4 firſt Days, and that beſides this Diſeaſe is not known, tho' very frequent, and does not manifeſt it ſelf till a long Time after the Fall.

'Tis a Luxation of a very particular kind, which the Strokes don't produce at firſt, but of which they are the occaſional Cauſes. 'Twas by having been deceived my ſelf, and having reflected upon my Error, that I found it out, and give the Obſervation of it at preſent, to the End that for the future the Number of Cripples may not be ſo great. There are many whoſe limping is only cauſed by this Diſtemper's not being known in its beginning.

False Brethren

Many of the Profeſſion, who were call'd in as well as my ſelf, pretended to excuſe the Surgeon, but by ſuch weak and extravagant Arguments as, far from deſtroying, confirm'd the Error of thoſe who blam'd him. There are many ſuch falſe Brethren, who only attack our Reputation by Silence; a dumb Language but ſo much the more eloquent as 'tis affected. As I am an Enemy to ſuch treacherous Perſons, far from being ſilent on this Occaſion, taking part with the Truth, I aſſured them that the Thigh was not luxated at the Time of the Fall, but long after. This Sentence ſeeming a Paradox. I explain'd my ſelf thus.

First Cauſe of this Luxation.

When the great *Trochanter* is ſtruck in a Fall, the Head of the *Femur* is thruſt with Violence againſt the Sides of the Cavity of the *Iſchion*; and as it fills this Cavity exactly, the Cartilages that cover it, the *Sinovial* Glands, and the round

round Ligament, which faſtens theſe two Parts together, muſt ſuffer a violent Contuſion, which will be followed by an Obſtruction, Inflamation, and Defluxion.

2d Cauſe. The *Sinovia* will flow down thither in a greater Quantity, will fill the *Capſula*, or *Tunica Ligamentoſa*, and the whole Cavity of the Articulation, which by Degrees will be followed by a Luxation. Becauſe this *Sinovia* which always diffuſes it ſelf, and even then more than in its natural State, being no longer diſſipated by the Motion of the Part, will force away the Bone with ſo much the more Eaſe, in that having relaxed the Ligaments, it puts them out of a Condition of reſiſting not only the Efforts which they make to drive the Bone from its Socket, but even thoſe of the Muſcles to draw it upwards.

Effects. Thus the Extenſion of the round Ligament is made by Degrees, and the Pain will increaſe and not diminiſh till this Ligament, being entirely relax'd and broken, has abandon'd the Head of the Bone to the whole Force of the Muſcles that draw it upwards.

What has been now ſaid, ſhews that, in this Diſeaſe, the Bone is not diſplaced at the Inſtant of the Fall, but a long time after, and by Degrees. The firſt Day the Bone keeps its natural Poſition, and the Thigh does not begin to be ſhortened, till the Head begins to be driven away by the *Sinovia*. One would think that the Thigh ought not to be ſhortened till the Head of the Bone is entirely out; nevertheleſs it becomes ſhorter by little and little, in Proportion as the Head makes its Progreſs outwards.

Remark.

Explanation. The ſpherical Figure of this Head is the Cauſe of this; it leſſens from its Neck to its Top, whence when the *Sinovia* has removed it one

Line

Line from the Bottom of its Socket, the Muſcles draw the Thigh a Line upwards; and if at that Time the Thigh were to be meaſured from the Place where the Head of the *Femur* touches the upper Side of its Cavity, 'twould be found a Line ſhorter; ſo that if this Head is forced 4 or 5 Lines, the Thigh will be found ſhorter by 4 or 5 Lines, provided it be meaſur'd from the Place where it touches the upper Side of its Socket. Thus as much Progreſs as the Head of the *Femur* makes outwards, ſo much the Thigh will loſe of its Length; and when the Head is entirely out, its Center, which in its natural State anſwered to the Center of the Cavity, will be found on the upper Side of this Cavity; and the Thigh will be ſhorter by half the Diameter of the Head: It would even be carried farther by the Action of the Muſcles were it not for the round Ligament, which retains it yet in that Place.

Things being thus, 'tis eaſy to conceive that the Pain muſt increaſe; in Effect whilſt the Head can be with-held by the Border of the Cavity, the round Ligament ſhares the Effort of the Muſcles with it, and is extended by little and little; but when the Head is once entirely forced out, the Ligament bears ſingly the ſtraining of the Muſcles, and the Anguiſh becomes inſupportable; and continues ſo till the Rupture of the Ligament, or its entire Relaxation, permits the Muſcles to carry the Bone as far as their Contraction will ſuffer them. 'Twas wrongfully therefore, that they cenſured the Surgeon, for not having diſcovered a Luxation, which did not happen till a long Time after the Fall.

It muſt be remark'd, that the Head of the Thigh-Bone being thus carried upwards and out-

outwards, may turn either before or behind. When it turns forwards, the Knee and the End of the Foot are outwards, and when it turns backwards (which is moſt often) 'tis diſcover'd by the Signs of the Luxation upwards and outwards before-mentioned.

This Diſeaſe is incurable, when, by Reaſon of its not being known, one does not ſpeedily apply the Remedies that are proper to prevent it.

Cure. I have ſeveral Times had Succeſs by uſing Defenſives, made with the White of Eggs, powder'd Allum, and aromatick Brandy, wherewith I moiſtened Compreſſes 8 or 10 double; I applied them all over the Articulation of the Thigh; I kept them on by a Bandage, that was only contentive, and I moiſtened them twice or thrice a Day with the ſame Liquor, without taking off the Dreſſings.

I placed the Patient conveniently in his Bed, and made him avoid all Motions capable of exciting Pain.

I bled him twice or thrice the firſt Day, and the following I repeated it more or leſs, according as the Pain required, and the Strength of the Patient permitted. One muſt not ſpare Blood on this Occaſion, if one would avoid Obſtructions in the Veſſels, and Inflamations and Defluxions in the Articulation.

A moiſt and refrigerating *Regimen*, the refined Juice of Plants a little bitter, together with Anodynes and Narcoticks, adminiſter'd with Diſcretion, are very helpful.

The Fate of ſuch as have this Diſtemper. The Fate of theſe Luxations is different; ſome there are, which cauſe a Palſy in the lower Extremity; others occaſion Defluxions which terminate in Suppuration, and others in fine, have no other ill Conſequence but limping; of theſe

theſe ſome leave ſo deform'd a Figure, that the Patients can't walk, others leave them the Liberty of walking at firſt with a Crutch, then with a Cane; and ſome there are who can go without any Support. Explication.

The Palſy is cauſed by the Compreſſion of the ſciatick Nerve, whereon the Head of the *Femur bears*; a leanneſs and waſting of the whole Limb, with an almoſt continual Chilineſs, are the Conſequences. Explication.

The Defluxions proceed from ſeveral Cauſes, ſome from the Pain, others from the Compreſſion of the Blood-Veſſels, and others again from the Palſy.

The Pain cauſes Defluxions by the Obſtruction of the Lymphatick and Blood-Veſſels, whence proceed Swellings, Dilatations, Ruptures, and a Diffuſion and Converſion of the Matter diffuſed into *Pus*. Theſe Abſceſſes are form'd in different Parts; ſome in the Socket of the Joint, when the *Sinovia* ferments, turns eager, and is changed into *Pus*: others in the Place where the diſlocated Head reſides; and there are ſome form'd in the Interſtices of the *Glutæi*, or the *Tricipites*; and, in fine, others are in the Parts that are diſtant from the Joint, as the Knee, the Leg and the Foot. Where the Abſceſſes are found

I have opened Numbers of Impoſthumes of this Nature, they are all hard to be cured; but thoſe which are moſt difficult are in the Cavity *Cotyloide*, or in the Place where the Head lodges: Theſe remain almoſt always fiſtulous, if the Patient does not die of a lingering Fever, a Vomiting and Looſeneſs; or a general Solution of the whole Maſs of Blood, whence follows a ſwelling in the Legs, and Thighs, a Bloating of the Face and Hands, and a Dropſy in the Breaſt and *Abdomen*. Obſervation.

At

At other Times, these Patients don't live so long after the opening of the Imposthume, because the Putrefaction gets into the Wound, and the Mass of Blood being corrupted by the length of the Disease, the Pain, the Fever, and the Want of Sleep, render the Application of the most proper Medicines, and the best concerted Operations, fruitless.

Observation. Oftentimes one finds the Bones rotted without being able to help it, either by Reason of the Difficulty of making the necessary Operations, or because the Strength of the Patient won't permit one to venture it.

A very remarkable Observation. I have found in opening such an Imposthume that the Bones were *carnify'd*; I mean that the Head of the *Femur* and the Cavity of the *Ischion* being separated from each other by the Luxation, and both of them laid bare by the opening of the Imposthume, had the same Consistence and Colour as Flesh; their Size was increased, and they were so like Flesh, that they bled at the least Touch. This Observation is very particular, but I shall relate in the Sequel several that are not less surprizing, and which prove, that if the Flesh becomes Bone, the Bones will also change into Flesh.

The Abscesses that are form'd in the other Parts, have nothing particular in them, but only that they return often.

When the Luxations that are not reduc'd have no fatal Consequences, they leave the Patient the Liberty of Walking, as had been said; but he is tormented with Pains that are caused by bad Weather, and are renewed by it: They become (as one may say) living *Barometers* that foretel Rain, or fair Weather.

I have also observed, that the Bones solder themselves together by a Sort of *Callus*, as fractured

ſtur'd Bones do, which forms an *Anchiloſis* of a particular Kind, ſince in this the *Anchiloſis* does not cauſe the Defect of the Joint, but on the contrary, the Defect of the Joint cauſes the *Anchiloſis*.

The Deformity that remains after this Diſtemper, proceeds generally from the pernicious Poſture which the Patient is ſuffer'd to lie in, it being hard to make him reſt in any other but that wherein he ſuffers leaſt; happy He! if this Poſture is not contrary to the natural Figure of the Limb. One of the Cauſes of Deformity.

They who can walk, do it with Pain at the beginning, the Crutches ſupply the Action of the Part; but by little and little, the Parts near which the Head lodges, become uſed to this new Tenant.

Of the Cure.

To make the Reduction of the Thigh, let the Bone be placed where it will, one muſt always make the Extenſion and Counter-Extenſion, and guide the Bone into its Socket. Cure.

The Counter-Extenſion and Extenſion muſt be ſtronger than in the other Parts, becauſe the Muſcles of the Thigh are conſiderably ſtronger, and 'tis always neceſſary to get the better of their Reſiſtance, to bring the luxated Bone near to, and even with the Cavity, into which it muſt enter. Neceſſary Conditions.

All the Methods that we have made uſe of in the Reduction of the Arm, to perform theſe two Operations, will not agree with the Thigh, there are only the Hands, the Straps, the *Mouſles*, *Hippocrates*'s Bench, and the Machine that I have deſcribed, which can be uſed therein. Methods of Reduction.

The Hands. The Hands are leſs proper here than elſewhere, not only becauſe the Muſcles are ſtronger, but alſo becauſe the Parts are too large, and cannot be graſp'd by the Hands of the Aſſiſtants.

The Straps. The Straps are applied in the ſame Manner as to the Arm, that is, to that Part of the Thigh which is near the *Condyles* of the *Femur*, to make the Extenſion; and the Body is with held by a looſe Strap which paſſes within the Groin, one End being turned under the Buttock, and the other over the Belly: They muſt be joined together four Fingers above the *Criſta* of the *Os Ilium*, and 'tis there that it muſt be held by ſome ſtrong Perſon, or that a String muſt be put thro' it, that is capable of reſiſting, and muſt be faſten'd to a fix'd Point, when one wou'd make Uſe of *Mouſles*.

I ſay nothing of the Manner of uſing the Bench of *Hippocrates*, becauſe it is no where to be found.

Of the Machine. If any one wou'd take my Machine, the Buttreſs muſt not be ſlit, nor muſt the Thigh be put thro' it, as is done by the Arm; 'tis ſufficient that there is a ſtrong Band, like one of the two that make the Button-hole, the middle whereof muſt reſt upon the Protuberance of the *Iſchion*; and one of the two Ends where the Pockets or Sheaths are (which muſt enter the Ends of the Branches of the Machine) muſt be put before, and the other behind: The Machine muſt be placed between the two Thighs, and the Strap of the Thigh muſt be faſten'd to the String of the *Mouſles*. As to the reſt, it is to be order'd as has been explain'd at full Length in the Reduction of the Arm.

3 Things to be obſerved. In all theſe Operations, there are three Things to be obſerv'd: Firſt, that the Patient

be

be placed on the oppoſite Side, and that the ailing Hip be turn'd upwards. Secondly, that the Leg be bent; and thirdly, that the Surgeon be always attentive to what paſſes in the Extenſions, to the End that he may make opportunely the neceſſary Motions with his Hands, which are different in all the Kinds of Luxations.

First manual Operation.

If the Thigh is diſlocated upwards, and internally, that is to ſay, upon the *Os Pubis*; the inward End of the Machine muſt be mov'd a little backwards when the Extenſion begins, and it muſt be brought forward when one thinks it ſufficient; and the Surgeon muſt work with his Hands ſo as to favour theſe Motions, that he may incline the Head of the Bone to take the Way of the Cavity.

2d manual Operation.

If the Thigh is luxated upwards and externally, the End of the Machine muſt be thruſt forwards, when one begins the Extenſion, then move it backwards, when it is thought ſufficient; during which the Surgeon muſt work with his Hands, ſo as to diſpoſe the Head of the Bone to re-enter its Cavity.

3d manual Operation.

If the Luxation is downwards and external, the Extenſions muſt not be ſo ſtrong; they muſt only keep the Muſcles in their right State, whilſt the Surgeon turns the Head of the *Femur* on the Side of its Socket, by taking the inner Part of the Knee in the Palm of one Hand, whilſt with the other he leans upon the Leg near the Foot, that he may make it turn (as it were) upſide down, which throws back the Head of the Bone, and guides it into its Cavity.

Remark.

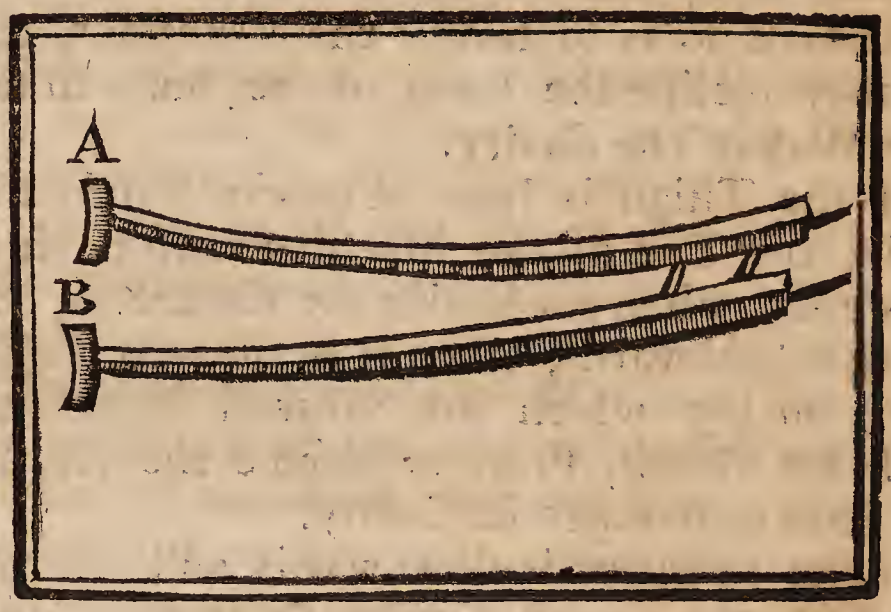
I don't believe this Luxation poſſible, but when it proceeds from an internal Cauſe, at leaſt I have never ſeen it.

4th manual Operation.

When the Luxation is internal upon the *Foramen Ovale*, the Extenſions muſt be but very ſlight, only to diſengage the Head of the Bone a little, whilſt the Thigh being put up to the Groin in a Napkin (ty'd like that which was uſed about the Arm) the Surgeon has the Napkin drawn, whilſt he bears upon the external Condyle of the *Femur*, near the Place where the Strap is faſten'd, which will draw the Head of the *Femur* back from the *Foramen Ovale*, and replace it in its Cavity.

Addition to the Machine.

I have even added to the two Branches of the Machine, two Sorts of Creſcents, whereof



the one (A) half bears upon the *Os Ilium*, and the other (B) upon the middle of the Thigh; then I put a Napkin within the Groin, I make a Loop which I faſten to the String of the *Mouſle*, and turning the Handle, I make three different Efforts, *viz.* The upper Creſcent bears againſt the *Os Iſchium*; the lower thruſts the Bottom of the Thigh inwards, and the Napkin draws the Top of the Thigh outwards. Theſe three Movements are abſolutely neceſſary to reduce the Thigh-Bone, when the Head is lodged in the *Foramen Ovale*.

It

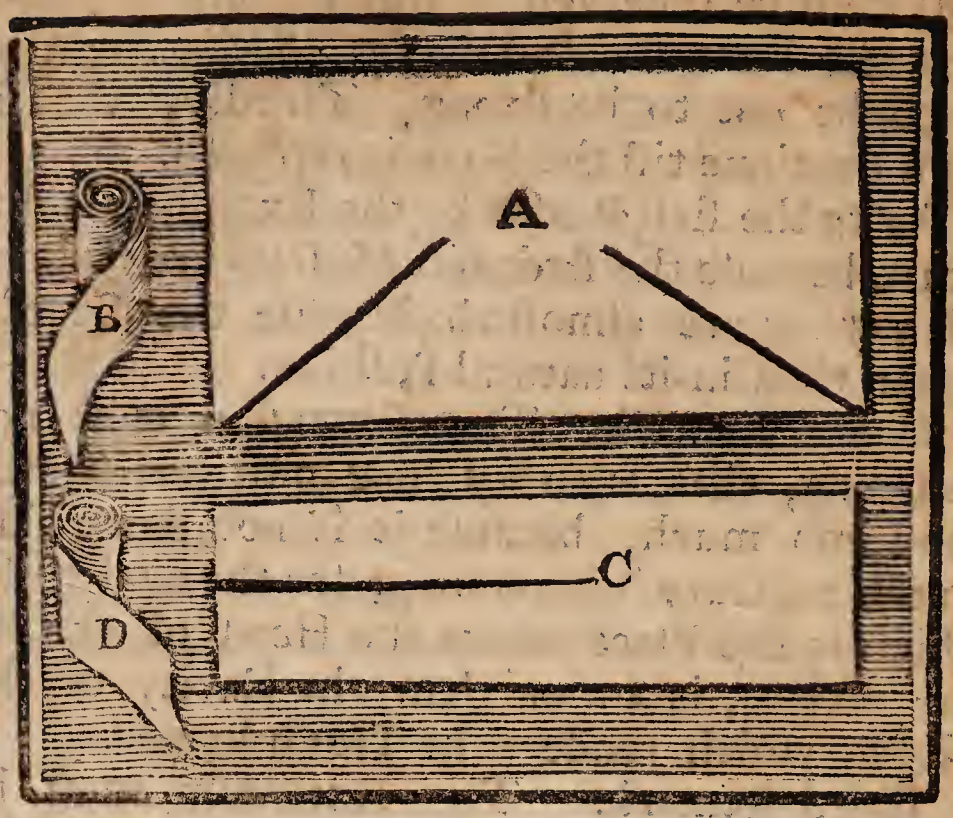
It muſt be obſerved in this Reduction; firſt, that the Extenſion is difficult. Secondly, that it ought not to be ſtrong. Thirdly, that it muſt continue till the Bone is replaced.

As to the firſt Remark, the Extenſion is difficult, becauſe the ſtrongeſt Muſcles are ſtretched, as they are almoſt all, becauſe the Bone is lower than in its natural Poſition.

Second Remark. The Extenſion muſt not be ſtrong, that is to ſay, one muſt not ſtretch the Limb much, becauſe it is not ſhorten'd; on the contrary 'tis too long, for the oval Hole, which is the Place where the Head of the *Femur* lodges, is lower than the Cavity of the *Iſchion*, which renders the Thigh longer.

Third Remark. The Extenſion muſt be continued till the Surgeon has drawn the Head of the Bone outwards, and placed it in the Cavity of the *Iſchion*; becauſe if the Extenſion were diſcontinued before the Bone were come to its Socket, it cou'd never get thither, and one would be obliged to begin again. It may be added, that when the Luxation is incompleat, and the Head is on the inward Border, the great *Trochanter* muſt be graſp'd with one Hand, and the *Femur* thruſt inwards with the other, to replace the Head: And on the contrary, if it is on the outer Border, the Thigh muſt be mov'd inwards to make the Head re-enter its Socket.

When the Reduction is made, a very long and broad Compreſs (A) muſt be laid on 8 double; the *Spica* muſt be made with the Roller (B) which muſt be four Fingers broad, and five Ells long; the Place where the Straps were muſt be cover'd again with the Bolſter (C) and kept on by the Swathe (D.) The Patient muſt keep his Bed and lie quiet; he muſt



be blooded, as has been ſaid above, and obſerve the Diet and *Regimen* that has been preſcrib'd ſo often elſewhere.

CHAP. XIII.

Of the LUXATION *of the* Rotula *and* Tibia.

THE *Rotula* may ſuffer an incompleat Luxation without the *Tibia*'s being at all diſlocated; but the Leg can never be disjointed without the *Rotula*'s following.

It luxates independantly of the *Tibia*, internally and externally; internally when the outward Cavity of the *Rotula* is upon the internal Condyle of the *Femur*; externally, when the inner

inner Cavity receives the external Condyle of the *Femur*.

The Leg cannot diſlocate without the *Rotula*'s following, becauſe the *Rotula* is join'd to it by a very ſtrong Ligament, whence it is obliged to follow the *Tibia* when the Leg luxates, be it inwards, outwards, before or behind.

The *Rotula* ſuffers a compleat Diſlocation when the *Tibia* is entirely luxated, and the disjointing of the *Rotula* is incompleat when that of the Leg is ſo likewiſe.

The Ways this Luxation is made.

The *Rotula* never ſuffers a compleat Luxation by it ſelf, nevertheleſs I have heard that this Luxation has been ſeen; but People are deceived; let us refer it to the Structure of the Part, it can never induce one to believe it.

For how can the *Rotula* diſlocate downwards, if it is kept upwards by the *Extenſors* of the Leg? How can it luxate upwards, if the tendinous Ligament keeps it always join'd to the Protuberance of the *Tibia*? They who have believ'd theſe two Luxations poſſible, or who ſay they have ſeen them, have taken a Fracture for a Luxation, or the Rupture of the Ligaments of the *Aponeuroſis* of the *Extenſors* for the Luxation downwards, or that of the Ligament that faſtens it to the *Tibia*, for the Luxation upwards; and they who think that the *Rotula* can throw its ſelf entirely on the inſide or on the outſide of the Articulation of the Leg, are deceiv'd in the ſame Manner, the Muſcles cannot allow theſe two Kinds. It remains that what has been ſaid above of the Luxation of the *Rotula* only, or with the *Tibia*, is true, and that this Bone cannot luxate otherwiſe. Reſult.

I was call'd to ſee a *Rotula* luxated upwards, becauſe they would convince me that this Diſlo- Obſervation.

cation was possible: In Effect, I found the *Rotula* mounted up above a Fingers Breadth; but upon examining, I discover'd that 'twas the Rupture of the Ligament that joins the *Rotula* to the *Tibia*, and I convinc'd the Assistants of it: It is hard to break, and the Tendons of *Achilles* are not less so; and tho' the Reality of both the one and the other has been disputed, several Persons that were Judges, and worthy of Credit, have since seen both the one and the other: One under the Hands of M. *Granniers* my Brother Member; and the other under the Cure of M. *Galin*. Those who doubt, may be more amply inform'd of these Facts in the second Volume, when I shall treat expresly of them.

I am not at all incredulous in Things that I think possible, but I can't acquiesce with those that I believe, not even out of Complaisance: There are so many who would set themselves up for wonderful Persons, that they would be ashamed to relate a Fact that has been seen by others; but let us not make a wrong Use of the Word. There must sometimes be a Difference made between *Seeing*, and *Seeing*; all those who see sick Persons, don't for that Reason know their Diseases; several see more sick Persons than Diseases, but few see more Distempers than Patients. This is often for want of examining, for all the World has Eyes and Fingers, and all the World knows, or at least all the World ought to know the Structure of the Parts, and the Disorder that happens when they are hurt. They who with this Knowledge don't judge well, owe it to their not making a right Use of it. Persons may be deceived altho' they see and touch, if they don't consider, because they pass Judgment too rash-

Advice before one judges.

ly:

ly: One muſt firſt examine well, then conſider, and then paſs Judgment.

What I ſay may perhaps not be agreeable to all the World, but I flatter my ſelf that I ſhall have on my Side all thoſe who are capable of judging.

The Leg is not eaſily diſlocated, for ſeveral Reaſons. Why the Leg is not eaſily luxated.

1. Becauſe it is joined by a *Ginglymus*.

2. Becauſe it is joined to the *Femur* in ſeveral Places, by ſtrong, compact, and croſs Ligaments.

3. Becauſe the Ends of the *Femur* and of the *Tibia* are large, and great Part of them touch mutually.

4. It is jointed by a *Ginglymus*, and all ſuch Joints are the harder to luxate, becauſe of the Multiplicity of their Heads and Cavities.

5. Its Motion is reſtrain'd to Flexion and Extenſion.

6. There is middle Cartilage which renders this Luxation more difficult, in that it deadens part of the Violence of the Motions and Blows, and raiſes the Borders of the Cavities, and renders them deeper.

The compleat Luxation is as uncommon as difficult, but the incompleat may happen more eaſily.

Whenever it does, whether it be before or behind, internally or externally, the Leg always turns to that Side which is oppoſite to the Luxation, which is not the ſame as in the compleat one; but this does not hinder the latter's being eaſy to be diſcover'd, becauſe the diſlocated Bones cauſe ſo great a Deformity, that there needs no other Sign of their disjointing: As for the reſt, the Bone turns on the ſame Side as the Luxation, as has been juſt ſaid.

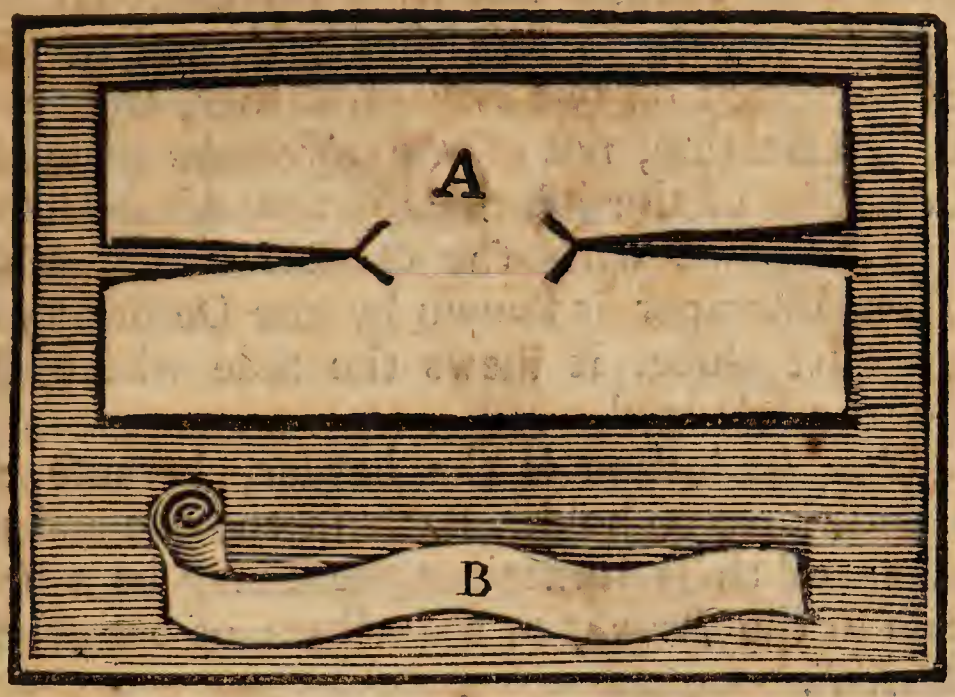
Prognoſick. If the Reduction is not made ſpeedily, an *Anchiloſis* will follow, becauſe the Ligaments are almoſt all broken, whence their nutritive Juices are diffuſed and congeal themſelves with the *Sinovia* of the Articulation. This will alſo happen even when the compleat Luxation has been reduced, if the neceſſary Precautions are not taken to avoid it, becauſe 'tis ſufficient for the forming an *Anchiloſis*, that the Ligaments are broken, and that the Liquor of the Articulation is no longer confined, nor reſtrain'd from diffuſing it ſelf.

Reduction. To reduce the *Rotula* when luxated, one need only extend the Leg ſo as that the *Muſculi Extenſores* may be beyond their *Tonus*, and preſs the *Rotula* with ones Hand to put it in its Place.

The Leg is reduced by an Extenſion and Counter-Extenſion in a ſtrait Line, on whatever Side it is luxated; and it will ſucceed, provided Care is taken to replace the Bone in its Socket, by graſping with one Hand the Condyles of the *Femur*, and with the other the Eminence of the *Tibia*, thruſting the one againſt the other the contrary Way, as when reducing Fractures.

Dreſſings. The Dreſſing is the ſame in both theſe Diſeaſes, being only contentive of the Remedy wherein 'tis ſteep'd; thus after the Reduction of the one or the other, one muſt lay on the Compreſs (A) which muſt be 8 double, then Circumvolutions muſt be made about the Part with the Roller (B) rolling it alternatively in Circles and Figures of 8, till the whole Swathe is uſed. It muſt be 3 Fingers broad, and 2 Ells long. The Regimen and general Remedies muſt be obſerv'd as in other Luxations.

CHAP.



CHAP. XIV.

Of the LUXATION *of the Foot.*

THE Foot luxates internally and externally, forwards and backwards. When the Head of the *Aſtragalus* is diſlocated inwards, the Sole of the Foot is turn'd outwards: When it is luxated outwards, the Sole of the Foot turns inwards: When it is disjointed before, the Heel is very ſhort, and the Fore-part of the Foot ſeems long; when 'tis diſplaced behind, the Heel is very long, and the Foot ſeems very ſhort. Kinds.

There is a Luxation that has been ſometimes taken for a Diſlocation of the whole Foot, when it is but the Luxation of the *Aſtragalus* and *Calcaneum*, from the *Scafoides* and *Cuboides*. A particular Luxation.

I never ſaw it but twice, and both Times it was occaſioned by the locking of the Foot in ſome Clog, as under the Iron Bar that makes a Bridge for the Kennels under great Gates, or

ſome

ſome other Thing like it. 'Tis eaſily conceived that if the Foot is thus held, and the Body is carried on one Side or 'tother, there will be a Luxation, not of the *Aſtragalus* from the Leg, but of the jointing of the *Aſtragalus* and the *Calcaneum* with the *Cuboides* and *Scafoides*. This Diſtemper is known by the Deformity of the Part alone, it ſhews the Side where the Bones are lodged.

Remark. The Reduction is the harder, becauſe the Hands have no hold. Both in the one and the other of theſe Luxations there may be a *Diaſtaſis* of the *Perona*, or a Fracture of one of the *Malleoli*.

Obſervation. I have ſeen ſeveral Times the Luxation of the *Aſtragalus* from the Leg attended with the Fracture of the *Perona*.

Remark. There alſo happens ſometimes a Fracture of the *Tibia*, but what is moſt frequent is the Fracture of the *Malleolus Internus*, which ſometimes happens alone, and often is accompanied with the *Diaſtaſis* of the *Perona*.

Obſervations. The compleat Luxation of the *Aſtragalus*, which ſome, but wrongfully, have called the Luxation of the *Malleolus*, is a very troubleſome Diſtemper. There are Practitioners who ſay it can't be cur'd, but that there will remain a Limping or Deformity: Nevertheleſs I have had the Advantage of curing ſeveral without leaving them any Ailment whatſoever.

Remark.

Advice for the Reduction. The Way to ſucceed perfectly, is to make ſufficient Extenſions; it can't fail but when there is not Strength enough for the Extenſions. For this Reaſon I was never contented with making Uſe of the Hands, I always took Straps, and would have had Recourſe to Machines, if more Force had been wanting: There is no Hazard run in employing too much, it

may

may be moderated; but, in not having enough, one runs the Riſque of making but an imperfect Reduction, which will leave the Patient either deform'd, or a Cripple.

Operation.

I faſten a Strap with two Loops above the *Malleoli*, and another with one Loop, which goes round, and graſps the Foot above the Heel and the Inſtep; both theſe Straps muſt be drawn by ſome body that is very ſtrong, and one muſt take hold of the Joint to make a proper Conformation.

When the Luxation is ſingle and without Fracture, one has not always need of ſtrong Extenſions made with the Strap, but nevertheleſs 'tis the ſafeſt Way to uſe them.

When the Extenſions are judged ſufficient, one muſt obſerve the four following Ways of working.

First Way of working.

If the Foot is luxated externally, the Small of the Leg muſt be taken hold of near the Ankle with the left Hand. (the Thumb being over the *Malleolus externus*) whilſt with the right one graſps the Sole of the Foot over againſt the Leg, and the Sole muſt be turn'd on the external Side, whilſt at the ſame Time the Small of the Leg is thruſt inwards.

Second Way of working.

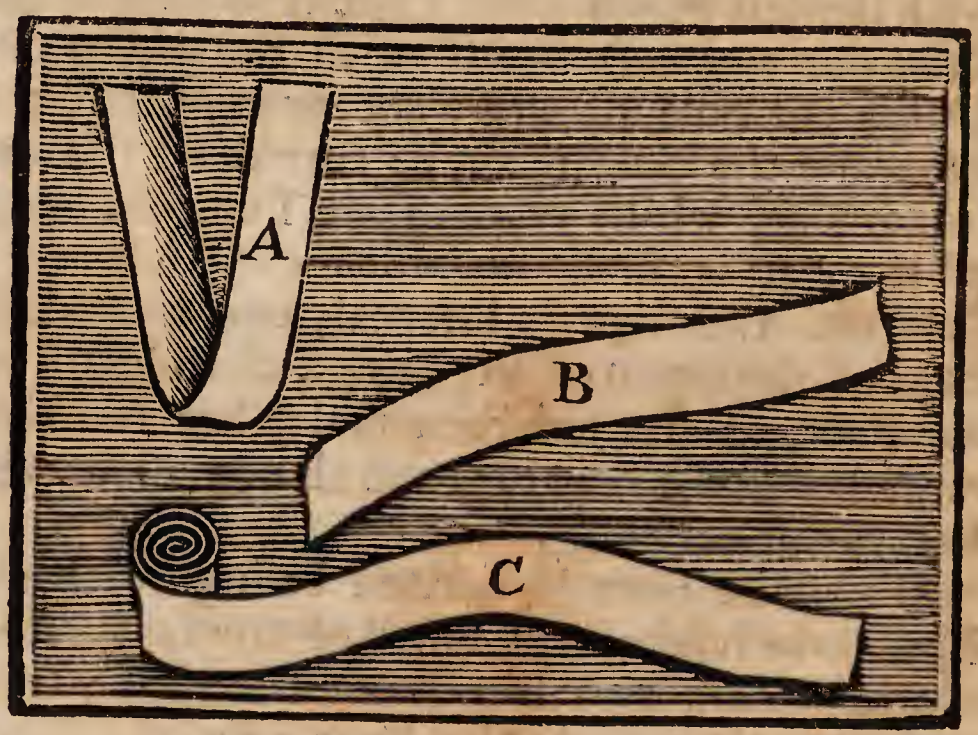
If the Luxation is internal, one muſt take hold of the Small of the Leg, and the Sole of the Foot, as has juſt been ſaid; but the Sole muſt be turn'd inwards, and the Small of the Leg thruſt outwards.

When the Foot is luxated before, with one Hand take hold of the Small of the Leg underneath, within two Fingers of the Heel; then with the other graſp the Foot near the Joint, and puſh at the ſame Time the Foot backwards, and the Small of the Leg forwards.

In

In fine, when the Foot is diſlocated behind, the Extenſions being made (as has been ſaid) one muſt hold the Small of the Leg before near the Joint, and with the other Hand graſp the Heel, and at the ſame Inſtant puſh the Small of the Leg towards the Heel, and the Heel towards the Leg.

The Dreſſing for theſe four Sorts of Luxations, conſiſts of a Compreſs (A) four double, which is laid on like a Stirrup, a-croſs the Sole of the Foot, its two Ends going, one on the inſide, and the other on the outſide of the Leg, as high as its middle; then another Compreſs (B) eight double muſt make a Figure of 8, paſſing under the Sole of the Foot, croſſing it ſelf on the Fore-part of the Articulation, and then wrapping round the two *Malleoli* going into a Circle from one to the other. To keep on the whole, take the Band (C) wherewith deſcribe a Figure of 8 paſſing over the Foot under the



Sole, then from the Sole upwards; cover the *Malleolus*, and paſs it behind the Foot above the Heels, then cover the other *Malleolus*, coming

ming back over the Foot and croſſing the Band, from thence to the Sole, then make a Circumvolution over the *Tarſus and Metatarſus*, and begin rolling the Band till the whole be taken up. The Foot muſt be placed in the Hollow of a ſoft Pillow; the Bed-Cloaths muſt be ſupported with a Cradle, a Regimen muſt be obſerved, and the general Remedies preſcribed.

The compleat Luxation where there is a Rupture of the Tendons, and Ligaments, or even of the Skin it ſelf, is a very fatal Diſeaſe, I never ſaw it cured; and the only Way to preſerve the Patient's Life is to cut off the Leg. One may nevertheleſs try to prevent it; but if in 24 Hours there is no Diſpoſition found towards a Cure, one muſt not defer the Amputation; to wait longer will be too late.

CHAP. XV.

Of Sprains of the Foot.

THIS Ailment has great Relation to the *Diaſtaſis* of the Wriſt, both by Reaſon it occaſions the ſame Pain, and becauſe the Pain and the Diſeaſe continue a long while; and that both are produced by the ſame Cauſes, and have a Number of Circumſtances that reſemble each other.

There are ſeveral Things in the Chapter of the *Diaſtaſis* of the Wriſt that may be uſeful here, wherefore I refer the Reader thither; I ſhall only ſay that the Luxations and Sprains of the Foot and Wriſt are long in curing, becauſe of the Tendons that paſs by this Articulation, which

which are very numerous, and don't only belong to the Foot, but to all the Toes, which has been remark'd elſewhere. Moreover each Tendon has a particular Sheath wherein it ought to ſlip, which facilitates the various Motions of the Limbs; and to render them yet more eaſy, there runs continually into their Sheaths a Liquor call'd *Sinovia*, which filtrates thro' little adjacent Glands, like thoſe whereof we have ſpoken in the Anatomy of the Articulations, in treating of Luxations in General.

Upon theſe Remarks two Reflections may be made: Firſt that the Numbers of Tendons which paſs by each of the Articulations here mentioned, and whereof we have enlarged very much in treating of the Sprains of the Wriſt, are extended; or to ſpeak like the Vulgar, ſprain'd, which cannot happen without being followed with great Pain, and an Inflammation, which will be ſo much the harder to cure, in that the Parts afflicted are extremely ſenſible.

The *Sinovia*, which is in the Sheaths of each of theſe Tendons, diffuſes it ſelf in their Intervals, which will cauſe, firſt an Increaſe of Pain.

2. A Hardneſs and Swelling of the Articulations.

3. Incurable Impoſthumes, as ſhall be ſaid hereafter.

The Pain increaſes; firſt, becauſe the Matter compreſſes the Tendons, foraſmuch as it takes up Part of the Place they ought to fill. 2dly, becauſe this *Lympha* ſtretches the Sheath that contains it, which cauſes very acute Pains, becauſe this Sheath is very ſenſible, foraſmuch as it is of the Nature of the Tendon, and the *Aponeuroſes*.

The

The Hardneſs and Swelling of the Articulations, proceed from two Cauſes. The firſt is that the Sheaths, Ligaments and Tendons which have been inflamed, are ſwell'd, and muſt for that Reaſon take up more Room, and conſequently inlarge the Joint.

The ſecond is, that this *Sinovia* takes up a great Space, and even forms Tumours wherein one may diſcover a Fluctuation, and 'tis this that is uſually called a gathering of the Glears.

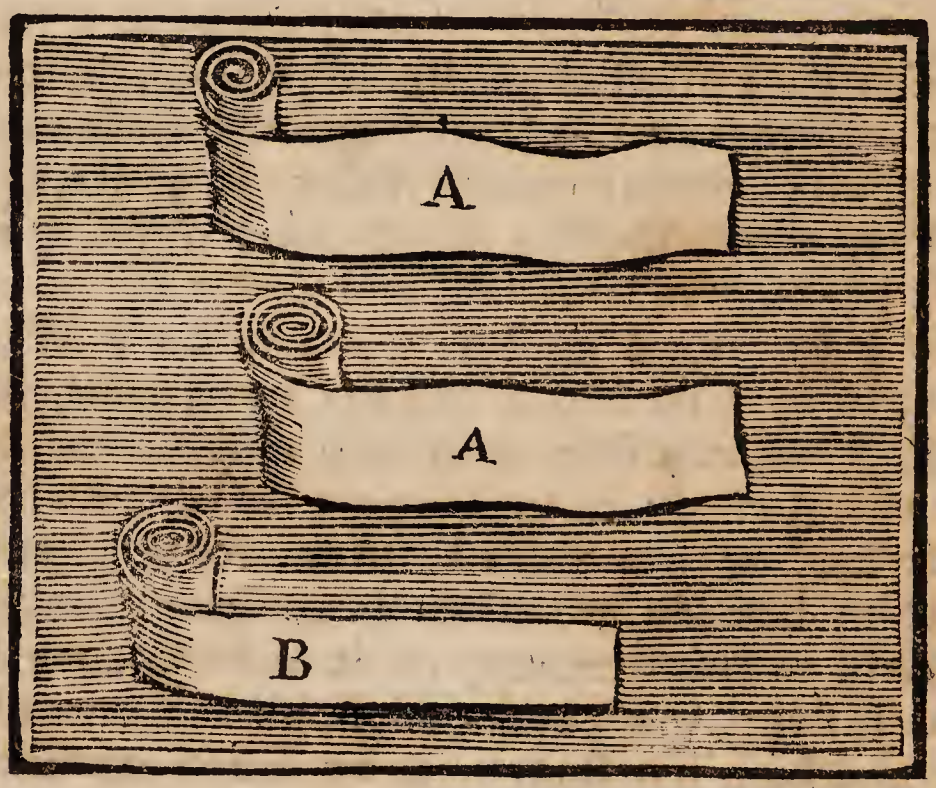
The incurable Abſceſſes are caus'd by this *Sinovia*, which coming to turn ſowr, and fermenting, by its Stay forms a *Pus*, which corrodes the Sheaths, Tendons, Ligaments and Bones; Diſeaſes which are the moſt dangerous, and the longeſt in curing of any, if they are not wholly incurable.

Cure of this Diſtemper.

The Part affected muſt, if poſſible, be put into a Bucket of Well-Water, at the Inſtant of the Fall; becauſe cold Water is a Repercuſſive, which hinders the *Sinovia*'s diffuſing it ſelf, prevents Inflamation, and abates and takes away Pain. Care muſt be taken if 'tis a Woman, to be informed if ſhe has her Terms, or expects them. One muſt alſo obſerve not to uſe this Remedy to ſuch as are troubled with Catarhs, or are ſubject to a Rheum and Cough; but if the Diſeaſe is too conſiderable to yield to this Remedy, or it was not done at that Inſtant, the Patient muſt bleed plentifully, and keep his Body open by emollient Clyſters. Spirituous Liquors may be applied upon the Part, as Brandy, or Spirit of Wine camphorated, and others which ſhall be preſcrib'd in ſpeaking of *Anchyloſes*, in Caſe the

Pain be moderate, or there be no Inflamation; for if theſe Accidents ſhould happen, emollient and anodyne Fomentations ſhould be made, and afterwards one ſhould prepare Baths, and Fomentations with Henbane and Frictions, with diſtill'd Oils.

Catharticks, that are hydragogues, Opiates, wherein there are abſorbent Powders, with *Mercurius Dulcis* and others, are very good, eſpecially if there is any Suſpicion of an internal Cauſe. Laſtly, they put the Hand or the Foot into the Belly or Throat of ſome Animal, as an Ox; or elſe they have Recourſe to hot mineral Waters, as thoſe of *Bourbon*, *Bourbonne*, *Barege*, *Aix la Chapelle*, &c. One muſt apply the Topicks with thick Compreſſes, roll'd in the Shape of the Bands (AA), then make a Bandage like that in the Luxation deſcrib'd above, taking the Band (B) 3 Ells long and 3



Fingers broad. I ſay nothing of Luxations of the Toes, they don't at all differ from thoſe of the Fingers.

I hope

I hope there is nothing more wanting upon the Subject of Luxations; there will be found either in the General or particular Accounts, Means to cure all Caſes, even ſuch as we have not been able to foreſee.

CHAP. XVI.

Of the Anchyloſis.

THIS Word ſignifies a Limb that is crooked or bent at the Place of its Articulation; but they give it a much more extenſive Meaning. One may call it an *Anchyloſis* where the two Bones are re-united, ſo that they can no longer move themſelves, and make but one, as if they had been ſolder'd together by a Matter of the ſame Nature as the Bone. Now as the Bones, thus ſolder'd at their Jointing, may either leave the Limb crooked ſo as it cannot be ſtretch'd out, or ſtrait, ſo as it can't bend, that makes immediately two Sorts of *Anchyloſes*; tho', according to its juſt Signification, it can only be proper to that where the Limbs remain crooked. Signification of the Word.

They extend yet much farther the Meaning of the Word, they take the Liberty of calling all Tumours in the Joints, which hinder their Motion, *Anchyloſes*; as the ſwelling of the Bones, that of the Ligaments, the Diffuſion of the *Sinovia*, the Dropſy of the Joints, the ſcrophulous Tumours that affect the *Epiphyſes*, and ſeveral other Diſeaſes of the Joints, which muſt nevertheleſs be only look'd upon as Cauſes of, or at leaſt Diſpoſitions to, an *Anchyloſis*. Extent of the Signification of the Word.

Diviſion of Anchyloſes.

It is proper therefore to divide the *Anchyloſes* into true and falſe: The true are ſuch wherein the Bones are ſolder'd at the Place of their Jointing, ſo as that they make but one Piece, and that the Motion is entirely loſt, not being able to ſtretch themſelves out if they are ſolder'd in a crooked Poſition, nor to bend if they are joined in a ſtrait one.

Falſe Anchyloſes.

The falſe *Anchyloſes* are thoſe where the Bones are not ſo ſolder'd, and wherein the Motion is not entirely loſt, but only diminiſhed by one of the Indiſpoſitions above-mentioned, or ſome other, whereof I ſhall ſpeak hereafter.

Cauſes.

The Cauſes of this Diſtemper are, Fractures, Luxations, Sprains, Swelling of the Bones, Ligaments, or Joints, purulent Defluxions, and the ill Qualities of the *Sinovia*.

Fractures may be the Cauſes of an *Anchyloſis* if they are in the Joint, if they are near it, and ſometimes even if they are at a Diſtance.

Fracture in the Joint.

'Tis not hard to comprehend that the Bones, which are broken in the Articulations, ſhed their nutritive Juices, which are the Matter whence the *Callus* is made; and that theſe Juices diffuſing themſelves in a common Place, form a *Callus*, which ſolders together all the fractur'd Pieces, and makes but one of them; thus there is no more Motion in the Part, it remains in the Situation that has been given it during the whole Cure, which forms an *Anchyloſis*.

Remark.

There are Fractures of the Joint which may not always be attended with an *Anchyloſis*, becauſe there will only be a Fracture of one of the Bones jointed together. For Inſtance, when in the Articulation of the Knee the *Rotula* only is fractured, and when in the Articulation of

the

the Elbow there is only a Fracture in the *Olecranum*.

When I ſay that they are not always attended with an *Anchyloſis*, I ſuppoſe that the neceſſary Precautions are taken to avoid it. In theſe Fractures the Matter of the *Callus* falls into the Joint, and as it is impoſſible to hinder it, I will lay down in the Sequel the Manner to prevent, at leaſt the Diffuſions creating an *Anchyloſis*. Remark.

The Fractures near the Joint are followed by an *Anchyloſis*, where the Matter, whence the *Callus* is form'd, ſpreads its ſelf in the Neighbourhood, confounds the Ligaments together, and incruſtates them, to uſe that Expreſſion; or when it fills the external Cavities that ſerve for the playing of the Joint, as when a Fracture of the lower Part of the *Humerus* gives the Matter of the *Callus* an Opportunity of filling the anterior and poſterior Cavities that facilitate the Motion of the Bones in Flexion and Extenſion. Fracture near the Joint. Obſervations.

Altho' the Fractures are diſtant from the Articulations, there may happen an *Anchyloſis*, when Care is not taken to ſtir the neighbouring Joints from Time to Time, becauſe it gives the *Sinovia* leave to coagulate for want of Motion. Fractures at a Diſtance from the Joint.

'Tis a Precaution that muſt be taken, whereof we already made Mention in the general Account of Luxations, and whereof we ſhall treat exactly in the Cure of *Anchyloſes*. Remark.

Luxations may produce an *Anchyloſis*, becauſe they are not reduced, or becauſe there has been a Contuſion, Inflamation, or a Neglect of moving the Bones from Time to Time during the Cure. Luxation the Cauſe of an Anchyloſis.

'Tis eaſily conceiv'd that the Bones which are not reduced, cannot move for the moſt Part, and Bones not reduc'd.

and that the continual touching of the ſame Surfaces is the neceſſary Conſequence of the Want of Motion, and conſequently of the *Anchyloſis*; foraſmuch as this Touching produces two Things; one is the Co-agulation of the *Sinovia*, for Reaſons that have been ſo often mentioned; the other is that the Ligaments, the Muſcles, and all that can contribute to Motion, are (as one may ſay) uſed to reſt; and when in the Sequel this Cauſe of reſt ceaſes, the Articulation will not be able to move.

Remark.

Compleat Luxation.

The Luxations that are compleat, and not reduced, are not ſo ſubject to an *Anchyloſis* as the incompleat ones. The Luxations of the Thigh, tho' not reduced, don't always hinder the Patients from walking, whether the Head of the *Femur* is lodged in the *Foramen Ovale*, or has made it ſelf a Receptacle under the *Glutæi*, and the Parts in Proceſs of Time are hardened and grown callous, ſo as not to be ſenſible of the Motion of the Thigh.

Obſervation.

Obſervation.

'Tis alſo obſerved that the Luxation of the Arm, tho' not reduced, is not always follow'd by an *Anchyloſis*, eſpecially when it is not attended with Pain, Swelling, and above all, when they have not made tormenting Tryals to reduce the Bones; becauſe that if the Patient has any Liberty of Motion left, he preſerves it, and even increaſes it, by making Uſe of his Arm for the Neceſſity of Life, which prevents the Adheſion which the Head of the Bone might contract with the *Omoplata*. Nevertheleſs an *Anchyloſis* happens oftner in this Luxation, when not reduced, than in any other Articulation by a *Genu*, becauſe the Bone of the Arm is, as it were, lock'd between the *Omoplata* and the Ribs.

It is not the ſame in incompleat Luxations not reduced: We ſee that the incompleat Luxations of the Elbow and Leg are always attended with an *Anchyloſis*. Incompleat Luxation.

When a Luxation has been accompanied with a violent Contuſion, an *Anchyloſis* will follow, if a particular Care is not taken, altho' the Bone has been ſpeedily and eaſily reduced. The Contuſion ſometimes affects the Cartilages and the Bones, and draws a Swelling there (which is a Sort of Inflamation:) This Swelling is capable of cauſing an *Anchyloſis*, as ſhall be ſaid elſewhere.

At other Times the contus'd Ligaments remain ſtiff, even after the Inflamation has ceas'd, they keep the Joints inflexible and tight, and hinder the Motion, and the Bones ſolder together if this Difficulty of moving continues long. Contuſion of the Ligaments.

This kind of *Anchyloſis* is not quickly form'd, it comes by Degrees in Proportion, as the Stiffneſs of the Limb increaſes; thus the Unpliableneſs of the Ligaments, and the Difficulty of Motion, are the mutual Conſequences of each other. Remark.

If the Contuſion affects the Bones, Cartilages and Ligaments, it ſometimes attacks the Muſcles, and they loſe their Power of acting, which cauſes an *Anchyloſis*, for Reaſons that have been ſufficiently particulariz'd. Contuſion.

I have not forgot that the Contuſion of the *Sinovial* Glands may be the Cauſe of this Diſtemper: But I ſhall ſay ſomething of it in the following Article, and hereafter I ſhall treat of it at length, in ſpeaking of the ill Qualities of the *Sinovia*. Sinovial Glands.

Sprains may occaſion an *Anchyloſis* by the pulling and tearing of the Muſcles and Tendons, and often by the Diffuſion of the *Sinovia*. Sprains cauſe an Anchyloſis.

The tearing, or at leaſt the forced ſtretching of the Ligaments, Muſcles, and Tendons, cauſes a Pain and Inflamation in the Joint, which is very often followed by an *Anchyloſis*; either becauſe the Inflamation increaſes and ſuppurates, or becauſe the torn Parts don't recover themſelves; or laſtly, becauſe the wandering *Sinovia* ſpreads and gathers it ſelf in the Cavity of the Articulation, or in the Sheaths of the Tendons. See what I have written upon this Head with Regard to Sprains, the *Diaſtaſis*, and Luxations of the Wriſt and Foot.

Remarks. This Liquor does not only moiſten the Joints, but the Tendons in their Sheaths, to facilitate their Motions. 'Tis for this Reaſon that one ſees the Tumour that happens in Sprains is not reſtrained to the Circumference of the Articulation; it ſpreads above and below the whole Extent of the Sheaths that give Paſſage to the Tendons: 'Tis there that the *Sinovia* diffuſing it ſelf, ſtretches the Sheaths, and compreſſes the Tendons, which augments the Swelling, and renders the Pain more acute. This hinders the Motion, and the whole together inclines the Part to an *Anchyloſis*, which infallibly happens, if one don't take all the neceſſary Precautions to prevent it.

Inflamation before the Reduction. The Inflamation of the Joints, by Reaſon of Luxations, may without Doubt be looked upon as the Cauſe of an *Anchyloſis*, when it comes before the Reduction, and hinders the Surgeon's ſetting the Bone, or when it follows the reducing of the Bone. Beſides that ſuch an Accident preſuppoſes a vitiating of the Blood and the *Lympha*, there often happen Suppurations on its Account, or elſe there remains an Obſtruction in the whole Part, which renders it unable

After the Reduction.

to

to move, and in Proceſs of Time forms an *Anchyloſis*.

'Tis alſo known that Luxations may be attended with an *Anchyloſis*, when Care is not taken to move the Articulation from Time to Time, beginning from the Day that the Pain and Swelling ceaſes. The Motion hinders the *Sinovia*'s co-agulating, it makes it fluid, and obliges it to return into its Receptacles; as ſhall be ſaid. On the contrary, when the Part is not ſtirr'd, the *Sinovia*, either by its Quantity, or by its Coagulation, becomes the Cauſe of an *Anchyloſis*.

Want of Motion what it cauſes.

Remark.

One of the moſt uſual Cauſes of an *Anchyloſis* is the ſwelling of the *Epiphyſes*: We have Numbers of Inſtances in Perſons afflicted with the *Evil*, the *Pox* and the *Rickets*; ſometimes alſo in thoſe who are troubled with the *Scurvy*, when the Blood is not turned to an acid, when the Juices, and eſpecially the *Lympha*, are coagulated.

Swelling of the Epiphyſes.

Obſervation.

When the *Epiphyſes* are ſwell'd by any of theſe Cauſes, the Heads and the Cavities that form the Articulation, no longer keep the Proportion they uſed to bear to the Ligaments; and theſe being too ſhort, with Relation to the tumefied Bones, bind them ſo exactly, that they deprive them of the Liberty of moving. The *Sinovia* being driven from the Places where the Bones are joined, flows back upon the Sides, coagulates there, and there being no longer any Motion, the Bones ſolder together, either by the *Sinovia* which glews them, or by the Adheſion which they contract between themſelves, in thoſe Places where they are ſtrongly and continually kept together.

Tumour the Cauſe of an Anchyloſis.

The

Defluxion. The Defluxions of the Joints are ſometimes the Cauſe of an *Anchyloſis*, whether they terminate in Suppuration, or in Induration.

Suppuration. Suppuration may cauſe this Diſtemper, when it deſtroys the Texture of the Bone, which it impairs and rots, or when it ruins thoſe Cartilages which render the Bones ſmooth and poliſhed. If the Texture of the Bone is ſpoiled and rotted in the Articulation, the moſt fortunate Iſſue that a Patient can expect, is Exfoliation; the Fleſh unites together, and making but one Bone of the Two, there follows an *Anchyloſis*.

Caries.

The Cartilage deſtroyed or rugged. The Cartilage alone being deſtroyed, or only impaired or render'd unequal will produce the ſame Diſeaſe, becauſe the Bones will unite if the Cartilage exfoliates; or they will only loſe their Readineſs in moving, if the Cartilages have only loſt their Smoothneſs: Then the moving Faculty growing more and more troubleſome and uneaſy, will be diminiſh'd, and in the End the Bones will ſolder together, and produce an *Anchyloſis* from this Cauſe alone.

Induration the Cauſe of an Anchyloſis. If theſe Defluxions terminate in Induration, and neither ſuppurate, nor can be diſcuſs'd, they will make the Motions of the Joints uneaſy, and deſtroy the pliantneſs of the Tunicles and Ligaments, which not being any longer able to bend or yield to the Motions, will be the Cauſe of an *Anchyloſis*.

Sinovial Glands. If theſe Defluxions attack the *Sinovial* Glands, an *Anchyloſis* will follow, whether the Suppuration ſpoils them, or the ſcirrhous Induration hinders the filtrating of the *Sinovia*. In either of theſe Caſes the Joints muſt be motionleſs, and the Bones will unite themſelves, ſo that whatever Force is uſed, 'twill be impoſſible to give their Articulations any Play.

If

If the Tumour of the Bones cauſes them to approach ſo near each other, as that they ſolder themſelves, and form an *Anchyloſis*; the ſwelling of the Ligaments does the ſame, becauſe they become ſhorter. Swelling of the Ligaments.

The moſt uſual Cauſes of this ſwelling are Inflamations, or an *Oedema:* The *Sinovia* has ſome Share in it, eſpecially in the Gout, as ſhall be obſerv'd in the Article following.

It may have been remark'd, by all that has been ſaid, that the *Sinovia* has a great Hand in the forming of *Anchyloſes*; and there is hardly any Sort wherein it has not ſome Part: Its Redundance or Deficience; its acid, ſower, or ſerous Qualities, are the Sources of a great Number of Diſeaſes of the Joints, and often of *Anchyloſes.* Sinovia the Cauſe of an Anchyloſis.

The Redundance of the *Sinovia* may firſt be cauſed by a certain Diſpoſition of the Blood, whereby it produces a greater Quantity of ſuperfluous Juices than uſual. Secondly, by the Obſtruction of the abſorbent Glands. Thirdly, by the exceſſive reſting of the Part. Redundance of the Sinovia.

'Tis eaſy to conceive that the Blood may be diſpoſed to furniſh a great Deal of *Sinovia*, by Cauſes which we don't dive into, for fear of equally diſpleaſing the Partiſans of Trituration, and thoſe who maintain the Part of Fermentation: However it be, the Blood, which ſupplies thoſe with Moiſture who are troubled with the watering of the Eyes, and which provides abundance of *Saliva* in the *Ptyaliſmus*, and which (as one may ſay) reſolves it ſelf into Water in the *Diabetes*, may very well ſupply the *Sinovial* Glands, with ſuch a Quantity of that Liquor, that the Joints may be over-run therewith. If the abſorbent Glands are obſtructed, the *Sinovia* will not be carried back; Cauſe of its Redundance

and

and even if the *Sinovial* Glands ſhould only filtrate the requiſite Quantity, that not having any longer free Paſſage, would gather in the Joint, overflow it, and produce all thoſe Diſorders which Exceſs is liable to create.

Phyſical Explanations.

Some, perhaps, will not admit of what I have juſt ſaid of the gathering of the *Sinovia*; nevertheleſs, 'tis the neceſſary Conſequence of the diſcompoſing the natural Structure, and this Diſorder which cauſes the gathering of the *Sinovia*, does not at all differ from that which occaſions the watering of the Eyes. I am to give a Proof of what I here advance, in Favour of thoſe who are ignorant of the Structure of the Parts, or who are not in a Condition to make a juſt Application. All the World knows that thoſe Parts of our Body which touch each other without Adheſion, as the *Lungs* the *Pleura*, the *Heart*, the *Pericardium*, the *Brain*, the *Dura Mater*, the *Apple of the Eye*, and the *Eye-lids*; all the World knows (I ſay) that theſe Parts are moiſtened in the Places where they touch, by a *Lympha*, which lubricating the Surfaces that touch each other, gives them a Readineſs of moving and ſlipping one againſt the other.

Phyſical Explications.

'Tis not unknown that what is ſuperfluous of this Liquor is taken back by abſorbent Pores or Glands, which convey it into the Maſs; I will cite three Proofs of this Mechaniſm: The firſt is in the Ventricles of the Brain, where the *Infundibulum* receives all the Humidity of the Ventricles, and carries it to the pituitary Gland, which diſcharges it into the *Sinus laterales* of the Baſis of the *Cranium*.

First Proof.

Second Proof.

The ſecond is in the Eye, where 'tis ſeen that after the lacrymal Gland has conveyed the Matter whence the Tears are produced, between the Apple of the Eye and the Lids, to lubri-

cate

cate thoſe Parts, the ſuperfluous Remains of this Liquor is abſorb'd by the lacrymal Points, which carry it into the lacrymal Ducts, and the Noſe.

The Third is the following Experiment: Let a *Troiſquart* be run into the Belly of a living Dog, then draw it out, leaving the *Canula* therein, thro' which let a Gallon of warm Water be injected; then draw out the *Canula*, and two Hours after open the Belly of the Dog, there won't be one Drop of the injected Water. But in fine, they who believe that the Bladder abſorbs from without inwards, don't attribute this Effect to it; let them make Tryal of the Breaſt, it will have the ſame Succeſs; all the Cavities have abſorbent Pores or Ducts; the Throat it ſelf is one for the *Saliva*, which flows into the Mouth, and one can't refuſe this Name to the lacteal Veins in the Cavity of the Inteſtines. Third Proof.

'Tis prov'd then that there are Glands or Pores which abſorb the Superfluity of the Fluids, that diffuſe themſelves in Sheets over the Surface of the Parts whereof we have been ſpeaking; and if we had not Proofs of their Exiſtence, we ſhould be obliged to ſuppoſe them, to give a Reaſon for ſeveral *Phænomenas*, as well natural, as the contrary; for Inſtance, the watering of the Eyes is caus'd by the Obſtruction of the lachrymal Points; theſe Points are the abſorbent Pores of the *Lympha Lachrymalis*, when this Liquor is no longer abſorb'd, nor convey'd into the Noſe, it falls in Tears down the Cheeks, which is call'd the watering of the Eye. Reſult.

The ſame happens in the Articulations of the Bones; there are *Sinovial* Glands which ſupply the *Sinovia*, and abſorbent Pores that carry it back. Application of the Example.

back. The Obſtruction of theſe Pores is one Cauſe of the gathering of the *Sinovia*, and, perhaps, in Conſequence of that, one of the Cauſes of the *Anchyloſis*, if this accumulated Liquor acquires a viſcous Quality, whereof we ſhall make mention in the Sequel.

The keeping of any Part exceſſively ſtill, occaſions the gathering of the *Sinovia*; 'tis known that the moving of the Bones contributes not a little to the Motion of this Liquor, becauſe it augments its Fluidity, and haſtens its Introduction into the abſorbent Pores. Reſt therefore is the Cauſe of the Redundance of the *Sinovia*, which may afterwards produce an *Anchyloſis*.

The Want of *Sinovia* is cauſed, 1ſt. By the Diſpoſition of the Blood to produce little of this Liquor. 2. By the Obſtruction of the *Sinovial* Glands; and 3. By the exceſſive moving of the Articulations.

If the Blood can be diſpoſed to produce too much *Sinovia*, by a contrary Diſpoſition, it may not produce enough. The Noſe, the Mouth, and the Eyes are dry, when the Blood does not ſupply the *Mucus*, the Spittle, nor the Tears; and the Body is bound in thoſe whoſe Blood does not furniſh the *Lympha* of the Inteſtines. Sweating is in vain hoped for in Diſtempers where the Blood is not inclined to furniſh the Matter that cauſes it; and the Urine which paſſes in great Abundance when one has taken Diuretick, will not paſs at all when the Blood is in a Diſpoſition contrary to that which theſe Remedies are ſometimes capable of giving it. By a like Cauſe the Blood may not be inclin'd to furniſh the *Sinovia*, and the Joints will be dry and without Unction.

Parallel.

The

The Obſtruction of the *Sinovial* Glands will have the ſame Effect, ſince 'tis the ſame Thing to the Joints, whether the Blood will not ſupply the Glands with *Sinovia*, or the Glands refuſe to receive it.

Exceſſive Motion diſperſes the *Sinovia*, continual Friction heats the Cartilages, Ligaments, and Muſcles of the Joints, and creates a *Phlogoſis* in the *Sinovial* Glands, which puts it out of their Power to furniſh Unctuoſity. Thus by one of theſe three Cauſes, or all together, the Joints will be without Unction, they will rub harſhly againſt each other if they move, or perhaps they will be ſo dry that 'twill be impoſſible to ſtir them, and the forc'd Reſt, which is continued by the Cauſe's remaining, will be quickly follow'd by an *Anchyloſis*. Effects of theſe 3 Cauſes.

The Acidity of the *Sinovia* may be derived from the Blood whereof 'tis Part, or by its Reſidence in the Joint, when detained there by any of the Cauſes abovemention'd. The Acidity which it derives from the Maſs of the Blood, may have different Degrees, and various Cauſes. The Cauſes of the Sinovia.

A certain Degree of Acidity will only render the *Sinovia* too fluid, it will loſe the Unctuoſity which makes the Motion of the Joints eaſy, and cauſes the Bones to ſlip one againſt the other without Noiſe, and to rub even the Muſcles that move them, and the Ligaments that with-hold them, without Pain. The Acidity which deſtroys the Unctuoſity of the *Sinovia*, will do the contrary, the Bones will not be able to ſlip with Eaſe, but they will rub harſhly againſt each other, and the Motions will be grating and painful.

If the Acidity increaſes, all will increaſe, the Cartilages will not only be deprived of the unctiEffect of the Acidity.

unctious Liquor that lubricates them, but their ſmooth and poliſhed Surface being corroded by the acid, will become uneven and rugged; and the Ligaments that were inſenſible of the moving of the Bones, and the Touch of the natural *Sinovia*, will, even in their State of Inaction, be ſuſceptible of Pain. The working of the Acrimony will irritate them, and cauſe a *Phlogoſis*, by ſo much the more painful, as they are faſtened to hard and inflexible Bodies, which cannot, by giving Way, ſhare with them in their inflam'd Tenſion.

Increaſe of Accidents.

By this Time the Articulation is inflam'd, the Acrimony ferments with the nutritive Juices, and in a little while the rotten Bones, and the ſuppurated Ligaments will form one of the moſt dreadful *Anchyloſes*.

The Lympha the Vehicle of the Salts.

The Cauſes of the Acidity of the *Sinovia* are various, a bad Diet may corrupt the Maſs of the Blood, and turn it acid; and as Acids are Salts, and Liquids are the Vehicles of Salts, 'tis not wonderful that the *Lympha*, which is the Vehicle of the whole Maſs of Blood, ſhould alſo be that of the acid Salts; and as the *Sinovia* is as an Emanation of the *Lympha*, 'twill not be ſurprizing that it acquires this Acrimony, which is capable of cauſing all the Diſorders abovementioned.

Cauſe of the ill Qualities of the Sinovia.

A bad Diet is not the only Cauſe that will turn the ſweeteſt Liquors acid. The Contact of certain Bodies that perſpire, may alſo very well occaſion it, for there are in the Blood Diſpoſitions contrary to Nature that are contagious. We ſhall ſpeak of them hereafter.

'Tis alſo obſerv'd that the *Sinovia* may become acid by its Stay in one Place. Reſt gives the acid Salts Time to unfold themſelves: It has even been ſeen ſeveral Times that the *Sinovia* being coagula-

lated by Sowers, has become Sower it ſelf, and has afterwards turn'd acid by another Degree of Fermentation; in the ſame Manner as Milk turn'd ſower, becomes acid after another Degree of Fermentation more or leſs. Thus the Stay of the *Sinovia* may be the Cauſe of the Acrimony it acquires. 'Twill be ſeen hereafter that the ſame Reſt may well incline it to Sowrneſs, and that the whole depends upon a Degree of Fermentation more or leſs, which can't be determin'd. However it be, theſe Sorts of vicious Qualities are often the Cauſes of the *Anchyloſis*.

We ought to judge of the Sowrneſs of the *Sinovia* as we have of its Acidity, it may derive this Quality from the Maſs of the Blood, or may acquire it by its Stay; the Cauſes being the ſame, we ſhall ſay no more of it; we ſhall only obſerve that the Sowrneſs of the *Sinovia* is ſometimes the Effect of the Pox, or the King's Evil, and that the acid is generally occaſion'd by the higheſt Degree of the Scurvy.

The ſerous Quality of the *Sinovia* (whereof I have given a particular Character) is not always, there are ſometimes Effuſions of Water in the Cavity of the Articulations, that one may call arthritick Dropſies, which are often cauſed by the Acrimony of the *Sinovia*, whereof we have ſpoken, and which I have known to be the Conſequence of the Coagulation of the *Sinovia*, which has fermented to ſuch a Pitch, as to diſſolve and reduce it ſelf into Water.

When the congeal'd *Sinovia* does not reſolve into a ſerous Matter, it hardens and produces the arthritick gouty Knot, whereof we ſhall ſpeak in the Sequel of this Chapter. Arthritick Knots.

Lympha in ſcorbutick Perſons.

We ſhall alſo obſerve that the *Sinovia* being coagulated by a Sowr, may very well be a Symptom of the Scurvy, becauſe this Diſeaſe begins by Coagulation, and generally ends in Diſſolution. 'Tis even ſeen that Coagulations caus'd by the ſcrophulous or venereal *Virus*, end in Solutions that tend to Acidity. The Nature of the Salts, and Turn of the Fermentation decides it; at leaſt 'tis the beſt Conjecture we can make upon this Matter, which is very problematical.

If People wou'd determine the *Species* of *Anchyloſes* by their Cauſes, it might eaſily be done; I have particulariz'd them in ſuch a Manner, that I believe I have forgot none. They who deſire to do it, need only run over each Kind, and give it a Name ſuitable to the Character of the Cauſes that produce it. Nevertheleſs, one may at firſt divide them into true and falſe, as has been ſaid in the Beginning of this Chapter.

Beſides, it may be diſcover'd that ſome are produced by external, and ſome by internal Cauſes: External, as thoſe which are occaſion'd by Blows, Falls, and violent Motions, and which are only the melancholy Conſequences of Fractures, Luxations, Sprains, or Contuſions.

Internal, as are all which proceed from the vitiating of the Blood, whether its vicious Quality has no particular Character, or it bears the Marks of the Evil, the Pox, the Scurvy, or the Gout.

Signs.

'Tis not neceſſary to give many Signs whereby to know a true *Anchyloſis*: The Impoſſibility of moving the Bones at their Joints, the invincible

cible Reſiſtance they make againſt Flexion and Extenſion, becauſe they are not any longer but one Piece, are ſufficient Marks to characterize a true *Anchyloſis*.

Neither have the other Indiſpoſitions which we have ſaid are falſe *Anchyloſes*, need of any other Judges than the Sight and the Touch; but to diſtinguiſh the Cauſes which have produced them, it is neceſſary to add together all that the Senſes and Reaſon can ſuggeſt to us.

'Tis known that that which is produced by the Fracture of all the Bones of a Joint, is not only found out by the Signs which at firſt diſcover'd the Fracture; but alſo by the Swelling of the Joint, which at firſt is painful, by the Difficulty of moving it, which increaſes by Degrees, ſo that at length 'tis impoſſible for the Chirurgeon to bend the Joint, tho' he ſhould even join his whole Strength to that of the Patient.

When one obſerves what paſſes at the Fracture of the *Rotula*, or *Olecranum*, if an *Anchyloſis* follows, there is no Doubt whence it proceeds. What is certain is, that theſe come more ſlowly than thoſe which happen in a Fracture of all the Bones of the Joint, and that it is more eaſily avoided, as ſhall be ſaid.

The *Anchyloſis* that is diſtant from the Fracture is eaſy to be known, when this Diſeaſe comes, one is not deceived by the Signs that foretell it, ſince 'tis generally cauſed by Negligence, and is yet longer in forming than the two others.

The Signs whereby we know that the *Anchyloſis* is occaſion'd by Luxations not reduced, are the ſame with thoſe we have given of Luxations; to which may be added the Swelling that

follows, and the Adheſion of the Bones which takes away all Power of moving the Joint.

The Signs, that the *Anchyloſis* is the Effect of an incompleat Luxation, are alſo contain'd in the Signs that I have given of this Sort of Luxation; and as for the *Anchyloſis* that follows a reduced Luxation, it will be diſcovered by examining the Accidents that preceded it, as a Contuſion, Inflamation, Swelling, or the Efforts that were made to reduce it; or elſe one muſt look into what follow'd the Reduction, as a Continuance of Pain, or the keeping the Part too long without Motion.

As for the Signs which diſcover that the *Anchyloſis* is cauſed by a Sprain, 'twill be known that the Patient has made ſome Effort, or falſe Step, that a Tumour followed, that he has not obſerved a proper Diet, and that the general Remedies have been neglected; and it may be diſtinguiſh'd whether the *Sinovia* of the Articulation only has a Hand in the *Anchyloſis*, or if that which moiſtens the Tendons and their Sheaths is alſo included; becauſe that if the *Sinovia* of the Articulation alone occaſions the Swelling of the *Anchyloſis*, it is reſtrain'd to the Circumference of the Joint; but, when that of the Tendons and Sheaths has a Share in it, the Tumour extends it ſelf a great deal above and below it: Beſides the Swelling is unequal, becauſe the Sheaths don't take up the whole Circumference of the Part; and that moreover there are circular Ligaments which withſtand the Swelling at the Place where the Tendons paſs over the Joint, which often cauſes a Sort of Obſtruction in the Part. When this gathering of the *Sinovia* is conſiderable, the Bones are ſometimes ſeparated from each other, and don't touch; this is ſenſibly perceived in the

the Articulation of the Leg with the Thigh. Lean your Hand upon the *Rotula*, it ſeems to fluctuate; preſs upon it, you will not find any Reſiſtance, till by your preſſing you have diſperſed all the *Sinovia* that is between it and the *Condyles* of the *Femur*; and if you take off your Hand, the *Sinovia* will lodge it ſelf again between the *Condyles* and the *Rotula*.

Theſe laſt Signs are marks of the Redundance, and gathering of the *Sinovia*; but it is difficult to diſtinguiſh all the Cauſes, which, as we have ſaid, are apt to make it gather. 'Twill not be eaſily found out what is the Cauſe that renders the Blood fit to ſupply this Liquor in great Quantity: Neither have we any Signs whereby to diſcover the Obſtruction of the abſorbent Glands; but one may know by the Relation of what has paſſed, whether exceſſive Reſt has occaſioned the accumulating of the *Sinovia*.

The Acidity of the *Sinovia* will be known by the Pain, the harſh Friction, and the grating of the Articulation; there happens a Sort of *Cliquetis*, but to be aſſured of that, the Habit of the Body muſt be examin'd, whereon there will be Tetters and Boils. One muſt alſo remark whether it has remain'd long in the Joint. becauſe its Stay occaſions a Fermentation, which uſually turns to acid or ſowr.

There are no Signs whereby to diſcover a ſowr or an acid, but thoſe which attend the Diſeaſes of this Kind, whereof the *Anchyloſis* is the Conſequence, for Inſtance; the Signs of the Scurvy, the Pox, the Evil, or the Gout.

Prognoſtick.

The *Anchyloſis* that comes at the Fracture of the Joint is incurable, becauſe it proceeds from the Effuſion of the Matter of the *Callus*, which has ſolder'd the united Bones.

But if the ſoldering is not yet perfect, and that but one of the united Bones is broken, as the *Rotula* at the Knee, or the *Olecranum* at the Elbow, the *Anchyloſes* not being quite form'd, one may ſometimes prevent it, as ſhall be ſaid. 'Tis the ſame in Caſe of the *Anchyloſis* that comes after a Fracture near the Joint.

The *Anchyloſis* that happens after a Fracture diſtant from the Joint, is not always incurable, becauſe it does not proceed from the Matter of the *Callus*, but only from the *Sinovia* that has been ſuffer'd to gather and coagulate in the Joint, by not ſtirring the Part from Time to Time during the Formation of the *Callus*. The *Anchyloſis*, occaſioned by an incompleat Luxation not reduced, is abſolutely incurable when once form'd; it may ſometimes be cured in the Beginning, when the Bone can be reduced, and one obſerves all that is requiſite in the Cure of *Anchyloſes* and *Luxations*.

The compleat Luxation, tho' not reduced, is not always attended with an *Anchyloſis*, and the Patients can even aſſiſt themſelves with their Limbs, tho' diſlocated, provided they make uſe of them when they are no longer in Pain.

The *Anchyloſis* that happens after the Reduction of the compleat Luxation, is troubleſome, if it is cauſed by the Contuſion of the Parts; the Blow or the Fall which produced the Diſlocation may have occaſioned the Contuſion; the

Bones

Bones themſelves being thruſt violently againſt each other, may be mutually bruiſed; and 'tis obſerved that this Sort of Contuſions are very fatal, becauſe they occaſion the inflaming and ſwelling of the Part, whence comes an Obſtruction and Stiffneſs in the Ligaments, and conſequently a Difficulty of Motion, or elſe a Suppuration, the Effect whereof is the Deſtruction of the Cartilages, and *Caries* of the Bones; and the Patient is very happy if he comes off for an *Anchyloſis*: Very often this Contuſion cauſes the Gathering and Stay of the *Sinovia*, which produces a Sort of *Anchyloſis* that indeed is leſs troubleſome than the others; but altho' it may ſometimes be heal'd, the Cure is too painful for the Patient and the Surgeon.

The *Anchyloſis* that comes after the Reduction, and which is only cauſed by the coagulating of the *Sinovia*, is not ſo troubleſome: One may often cure them, provided the Bones are not ſolder'd, and that there is ſtill ſome Fluidity in the *Sinovia*.

The *Anchyloſis* that proceeds from the Acrimony of the *Sinovia*, is more fatal than that which is cauſed by its Sowrneſs, becauſe 'tis ſeldom that the Acidity does not deſtroy the Ligaments, the Cartilages, and the Bones themſelves, which complicates this Diſtemper, and makes it incurable, the rather in that the Scurvy is the Cauſe; and 'tis known how hard it is to cure the that Diſeaſe, when it bas begun to attack the ſolid Parts.

When the *Anchyloſis* proceeds from the Predominancy of Sowrneſs in the *Sinovia*, it is not ſo fatal, becauſe Sowrneſs coagulates this Liquor. The Coagulation keeps all its Salts inactive that they don't operate, and the Solids are ſheltered from their working, at leaſt for a

Time, till the firſt Principles of this Liquor ferments a new; for it has been obſerved, in the Cauſes of the congealing of the *Sinovia* by Sowrs, that they may by again fermenting become acid: However it be, 'tis always good to ſay that the Coagulation is leſs fatal than the Solution. But of two Cauſes of its Coagulation, *viz.* the venereal Sowr, and the ſcrophulous Sowr; the latter is infinitely the moſt troubleſome, becauſe we have a Specifick for the Pox, and we have but Palliatives for the Evil; at leaſt it is common to cure the Pox, and very extraordinary to cure the Evil; inſomuch, that it may be ſaid the pocky *Anchyloſes* are curable, and the ſcropulous ones ſeldom healed. One may add, that the ſcrophulous Ferment may be eradicated without curing the ſcrophulous *Anchyloſis*, and 'tis ſeldom that the pocky *Anchyloſis* is not healed, when the Bones are not quite ſolder'd.

The *Anchyloſis* that proceeds from the Dropſy of the Joint, is leſs fatal than that which is produced by the pargetty or plaiſtery Concretion of the *Sinovia*, unleſs the ſcorbutick or ſcrofulous Ferment is the Cauſe of the *Sinovia*'s Solution into Water. The Cure of the *Anchyloſis* is palliative or Radical; the Palliative is only proper to mitigate the Pain of ſuch as have incurable *Anchyloſes*, which we have termed true ones, ſuch as thoſe where the Bones are entirely ſoldered; the Radical Cure is for thoſe we have termed falſe, and which not deſerving the Name of *Anchyloſes*, have been looked on as Diſpoſitions tending to this Diſtemper, or as the Cauſes that produce it.

The true *Anchyloſes* ought to occaſion no other Accidents but the Loſs of Motion; 'tis an indiſpenſable Conſequence of the ſoldering

of

of the Bones that form a Joint; therefore the ſoldering of the Bones is not capable of producing it by it ſelf: When the Bones are ſoldered together after its Fracture in the Joint, the Accidents that attend and follow this Diſtemper from the Beginning, are, Swelling, Pain, and Defluxions.

All theſe Accidents which at firſt were cauſed by the Blow, or Fall, are countenanced by the Obſtruction that remains after the Conformation of the *Callus*; the Ligaments being choak'd up can't eaſily recover themſelves, becauſe the Veſſels that belong to them, and even thoſe that are near them, are obſtructed by the Compreſſion cauſed by the Bigneſs of the *Callus*; and this Diſorder which deſtroys the Joint, muſt cauſe a conſiderable Confuſion in the *Sinovial* Glands, and in the flowing of their Liquor.

All theſe Things, which muſt be looked upon as the Cauſes of the Swelling, the Pain and the Defluxions, preſcribe the Uſe of a *Regimen*, general Remedies, and Topicks.

The Patient muſt not obſerve a ſevere Diet, he muſt only be moderate in the Quantity of his Food, regular in his Hours of eating it, and very circumſpect as to the Quality of it. Freſh and moiſt Victuals are proper; Ragouts, ſowr Fruit and Milk, are abſolutely contrary.

He muſt keep both his Mind and Body at Reſt; the affected Part muſt not be moved but very moderately, and the whole anſwerable to it. I mean one muſt not attempt to move the Place of the Articulation, not only becauſe 'tis impoſſible to recover its Motion, but alſo becauſe it wou'd occaſion freſh Irritations, and conſequently Pain, Tumour and Defluxions. Beſides Motion, which is uſeful for the Cure

of

of ſome Sorts of *Anchyloſes* where the *Sinovia* abounds, or is clotted, is entirely impracticable in this Caſe, becauſe the Bones being ſolder'd by the *Callus*, will not allow of any Motion.

What muſt be done then, if the *Sinovia* ſeems to be gathered in ſome Place near the Joint? One muſt make Frictions with hot Cloths, to ſupply the Defect of Motion in the Joint, and to keep the *Sinovia* as fluid as poſſible; by the often reiterating of theſe Helps, which are what Surgery makes Uſe of to ſupply Defect of Motion; this Liquor will be attenuated, and the Topicks proper to diſpoſe it may work more effectually.

For this Purpoſe one muſt uſe Pumpings of hot Water, which muſt fall from a great Height, to the End that they may penetrate the better. If the *Sinovia* is very outwards, it will not be long before the Succeſs of this Remedy is perceived; if it is deep, it requires more Time.

When the *Sinovia* ſeems coagulated, one muſt diſſolve ſome *Sal Marine*, or *Sal Armoniac*, in the Water. This pumping is very effectual, it muſt be repeated ſeveral Times a Day, and muſt be given for a longer or ſhorter Time, according as the ſick Perſon can ſupport it patiently.

If this Remedy don't diſperſe the *Sinovia*, 'twill at leaſt render it more fluid, and in a Condition to be diſperſed by other Means. Frictions made before the Fire with Spirit of Wine and Lavender, and Fomentations of aromatick Wine often repeated, are very ſucceſsful; but theſe muſt not be uſed till the Pain is conſiderably abated: We will mention elſewhere what muſt be done to allay it, when we

treat

treat of the Means to prevent or cure Defluxions.

'Tis alſo known that hot Waters are perfectly good to diſſolve and diſperſe Obſtructions in the Joints; thoſe of *Aix la Chapelle*, *Bourbon*, *Bourbonne*, *Barege*, and others are in great Reputation; a great Number of ſick Perſons go thither every Year, and return cured or eas'd. Theſe Waters are uſed for Baths, Pumpings, and even to drink; ſome of them produce Slime or Mud, which being applied hot like a Cataplaſm, liquefys and diſſolves the Matter that cauſes the ſwelling of the Joints. I have known ſeveral Diſtempers of this Sort perfectly heal'd thro' the Means of theſe Waters.

When there is a Diſpoſition to an *Anchyloſis* in Conſequence of the Fracture of a Joint where there is but one Bone, it ought to be moved gently, and repeated every Day that the Dreſſings are taken off, afterwards every other Day, and then every Day: By this Means 'twill prevent the Matter of the *Callus* from diffuſing it ſelf between the *Condyles* and the Cavities, where it would coagulate and form irregular Prominences which would ſtop the Motion, and ſolder the Bones.

I have known an *Anchyloſis* of the Knee, where the Bones were not yet united; it was cauſed by the Fracture of the *Rotula*; the Matter of the *Callus* had penetrated between the Eminences and Sockets of the Joint: The Stiffneſs of the Knee made it apprehended that there was a perfect *Anchyloſis*, but the ſtirring it, which had been neglected till then, was put in Practice with ſo much Succeſs, that in leſs than a Month the Patient bent and extended the Leg ſufficiently, to walk with Eaſe enough.

The

The *Anchyloſis* that happens after Fractures near the Articulation, is only cauſed by the ſpreading of the Matter of the *Callus* about the Ligaments, or elſe by the Reſt, which certain Perſons, little verſed in the Surgery of the Bones, very unreaſonably make the Patient obſerve, more exactly on this Occaſion, than on any other.

To avoid an *Anchiloſis*'s being cauſed by either of theſe Things, the fractur'd Part muſt firſt be placed ſo that the Matter of the *Callus* may have a Biaſs to carry it from the Articulation. Secondly, Compreſſes muſt be applied, ſupported by ſeveral Circumvolutions of Bandages between the Articulation and the Fracture, which by a ſoft Compreſſion will ſerve as a Rampart againſt the Matter of the *Callus*.

In fine, the Joint muſt be moved, and ſooner in this Caſe than any other. One muſt not follow the Error of thoſe who pretending to be expert in this Part of Surgery, are not aſham'd of ſaying they are infallible: The Truth is, they only ſeduce the Vulgar, or at moſt only thoſe of a better Rank, who believe they know all, without having learnt any Thing. Not to fall into the ſame Error, on the firſt taking off the Dreſſings, in a Fracture of this Kind, one muſt begin to move the Articulation, the Bones run no Hazard of diſplacing. This Fear, which is common to all Bone-Setters, tho' without Foundation, is regularly obſerv'd by ſuch as don't reflect that when the Fractures near the Joint are reduced, they are not eaſily diſplaced, becauſe that a much greater Part of the broken Bones join together, than in thoſe which are fractured in the middle, the Middle of Bones being much ſmaller than their Ends.

As

As for the *Anchyloſes* that are the Conſequences of Fractures at a Diſtance from the Joint, Motion alone will prevent them, and will even cure them, where a Redundance or too great Thickneſs of the *Sinovia* has already inclined the whole Joint to an *Anchyloſis*. One may alſo uſe the Topicks preſcribed heretofore. The Diſpoſitions to an *Anchyloſis*, that proceed from a reduced Luxation, are directed by the following Means.

If there has been a Contuſion by the Blow, or the Fall, or by the ill Management of ſome ignorant Perſon; one muſt bleed the Patient conſiderably, then put anodyne Cataplaſms upon the Part, then partly Diſſolvents with the Anodynes, and afterwards Diſſolvents alone; and when the Pain and the Swelling is over, one muſt begin to move the Part gently, without forcing any Thing, that one may not draw a freſh Defluxion which may be more fatal than the former.

If the Tendency to an *Anchyloſis* proceeds from having overthrown the Sides of the Cavity in the Time of reducing the Bone, or from not having conducted the Head of the Bone by the ſame Way which it took in iſſuing from its Place; one muſt make Uſe of the ſame Remedies as in the Caſe aforegoing; but I doubt whether the Cauſe can be taken away, I mean that the Sides can't eaſily be raiſed that are overthrown, and that it ſeems yet harder to me to remedy the laſt Error, becauſe that the ligamentous Tunicles of the Articulation being pinched, between the Head of the Bone and its Cavity; one muſt diſplace the Bone to ſet it better, after having diſengaged the Tunicle.

If after the Reduction they have neglected moving the Part, it muſt be help'd, as has been

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already ſaid, in ſpeaking of the ſame Error with Regard to Fractures.

When the Bone is not reduced, one muſt obſerve whether there be a Tumour, Hardneſs, Inflamation and Pain, or whether the Part has retained almoſt its natural Situation. If there be a Swelling, Tenſion, or Inflamation, Recourſe muſt be had to general Remedies and Topicks; and when theſe Symptoms are over, one muſt try to reduce the Bone: If it ſucceeds, the *Regimen* and Topicks muſt be continued; and if it fails, the Patient will be lame, and an *Anchyloſis* will follow, as has been ſaid in the Cauſes.

If there is no Inflamation nor Pain, the Patient ſhould bleed twice, and then the Reduction ſhould be attempted, unleſs the Luxation be of too long ſtandiug. I have ſet Arms that had been ſix Months and a Year diſlocated; and in others that have been luxated but two Months, I have not been able to ſucceed, nor others after me; which may proceed from the *Sinovia* that fills the Cavity of the Joint, or the Tenſion of the Muſcles. After having in vain attempted it, I adviſed a Perſon to the Waters of *Bourbon*, which diſperſed the *Sinovia*, and made the Muſcles pliant; he came back Poſt to *Paris*, and I made the Reduction with Eaſe. Another Perſon of the Duke *D'Albe*'s Retinue had diſlocated his Arm ſix Months, I could not reduce it, he went to the Waters of *Barege*, and a Surgeon of *Bayonne* ſet it two Days afterwards with a great deal of Eaſe.

We have ſaid that an incompleat Diſlocation not reduced is ſooner attended with an *Anchyloſis*, than that which is compleat; neither have I ever ſeen a Tendency to an *Anchyloſis*, proceeding from this Cauſe, cured, when a Month

Month had eſcaped without making the Reduction: Nevertheleſs, I adviſe making the Attempt to replace the Bone, the worſt that can happen is not ſucceeding; and the Surgeon has nothing to reproach himſelf, provided he does all that Art preſcribes: Beſides, it ſucceeds ſometimes, and 'tis ſufficient that it may once do, to determine us to make the Attempt.

It is eaſier to heal thoſe Diſpoſitions to an *Aachyloſis* which proceed from the want of *Sinovia*, than thoſe that are cauſed by its Redundance, unleſs the Want is occaſioned by the Want of the *Sinovial* Glands, as has been obſerved in the Cauſe of it.

If the Joints of any one are without *Sinovia*, becauſe the Blood is not diſpoſed to ſupply the Glands with it; one muſt bleed the Patient, make him obſerve a *Regimen*, preſcribe the general Remedies, and let him uſe dilating Broths, Drinks that are mildly bitter, Baths of emollient Plants, gentle Purges, light Frictions upon the Part affected, and emollient Cataplaſms, wherein ſome black Soap muſt be put; all theſe Remedies are proper. Pumping ought not to be omitted, it works Miracles every Day in the *Cliquetis*, which is a Diſpoſition tending very much to an *Anchyloſis*.

On the contrary, if the *Sinovia* abounds too much, the Patient muſt bleed more plentifully, eſpecially if the Exceſs of that Liquor cauſes Tenſion and Pain; he muſt be confined to a very exact Diet, he muſt take Broth and Drinks that are gentle Operatives, the Part muſt be chafed with hot Cloaths, and diſſolvent Cataplaſms be laid upon it; one muſt uſe Pumpings with a Decoction of the ſame Plants, and often move the Joint to oblige the *Sinovia* to re-enter its Receptacles: and if this don't ſuffice, lay

on a Cataplasm of dissolving Herbs, adding to it aromatick Plants, Snails, or Frog's Spawn; I use Pumpings of Lime-Water, together with a Solution of *Sal Armoniac*. This Liquor is excellent on Account of the volatile Salt that separates from it, which is very proper to render the *Sinovia* fluid; 'tis a Remedy of my own Invention, which I have made Use of very successfully, not only on this Occasion, but many others.

The Time and Manner of moving the Joints that are inclin'd to an *Anchylosis*, is not an indifferent Thing. As to the Time, it ought always to be when the Violence of the Pain is over; it is dangerous to make these Sorts of Motions, as long as it continues, for that would increase it, and Convulsions, Faintings, and Death it self would follow.

The Manner of stirring them depends upon the different Motions which the affected Joint is capable of. The Joints articulated by *Genou*, must be moved gently, and in a Round, taking Care never to force in any Degree the narrow Bounds prescribed by the Ligaments. 'Tis for this Reason that the Arm must never be turned round, without being at a little Distance, and the Thigh in Proportion; the Fore-Arm and the Leg must not be extended beyond their strait Figure, nor be bent but a little beyond the right Angle, so that in bending them one must never make the fore Part of the *Cubitus* touch the Arm, nor the Calf of the Leg the hinder Part of the Thigh; it would cause Extensions and tearing of the Tendons, which would soon be attended with more melancholy Symptoms.

The *Sinovia* often coagulates, in Spite of the Use of all these Remedies, and solders the Bones,

Bones, and forms an *Anchylosis*. At other Times this Liquor dissolves, and is changed into Water, and either thro' the Fault of the Receptacles destin'd to carry it back, or perhaps because being watery, it has not Configuration proper to pass thro' them; it remains in the Joint, and forms a Dropsy: Then nothing being able to disperse it, a Puncture must be made with the *Troisquarts*, or with the Lancet, but Care must be taken not to be deceived in mistaking an *Oedema* for a Dropsy.

The *Oedema* seizes on the Cells of the Fat, and the Dropsy on the inner Part of the Articulation. The Tumour of the *Oedema* blends it self with the rest of the Limb, that of the Dropsy is confin'd within the Compass of the Tunicle of the Joint. The *Oedema* has no Fluctuation, the Dropsy discovers it self chiefly by this Sign. In the *Oedema* the Bones of the Joint are brought near one another, in the Dropsy they are separated. For Instance, if there is a Dropsy in the Knee, the *Rotula* juts out, because the Water that is diffused, removes it from the *Condyles*; on pressing the *Rotula*, it gives Way to the Finger, untill it touches the *Condyles* of the *Femur*, which is, when by thrusting it, all the Water is forced away that was between it and the *Condyles*.

Again, one must not take a Fluctuation of glearous Matter for a watery Fluctuation; Water answers clearer than Glears, these have but an obscure Fluctuation.

When a Person is convinced that there already is an Effusion, he must make the Puncture with the *Troisquarts*, or the Lancet. I have never made this Operation but with the Lancet; I don't doubt but the Use of the *Troisquarts* is as good as the Lancet. When this O-

peration is made, whether it be with the one or the other, Care muſt be taken to place the Part ſo as the Puncture may be made in the ſhelving Place, that the Waters may not ſtay in any Corner of the Articulation.

The thickeſt Parts of the Joint muſt not be pierced; on the contrary, the ſmalleſt muſt be choſen, to the End that fewer Parts may be pierced: Thoſe muſt be choſen preferably to others where there are no *Aponeuroſes*, becauſe that Accidents may happen thro' the Diviſion of thoſe Parts; one muſt preſs all the Neighbourhood of the Joint very exactly, thus the Water may be expelled more exactly.

If, inſtead of Water, there is an Evacuation of Glears, the Surgeon may be glad that he has preferred the Puncture of the Lancet to that of the *Trois-quarts*, becauſe the Glears iſſue out better thro' the Puncture of the Lancet.

Having cleanſed the Joint well, lay upon the Puncture a Pledget cover'd with Balſam of *Arcæus*, and keep it on with a little Plaiſter of *Nuremburg*, or burnt Ceruſe. The reſt of the Part muſt be wrapt round with the Cataplaſm preſcribed above, it will be found very effectual in bringing the Patient to a perfect Cure. If a Tumour comes, the Patient muſt bleed, it is not neceſſary to ſtay ſtill Accidents happen, 'tis better to prevent them. If the *Sinovia* becomes purulent, 'tis not ſufficient to make a Puncture; one is obliged to make large Inciſions on both Sides the Joints, for all this Maxim of ſome Practitioners, who ſay that the Joints muſt not be laid bare; theſe Parts are no more to be reſpected than the others, when there is a Neceſſity, I have known ſome Perſons to obſerve this Maxim, let the *Pus* ſtagnate in the Joint, and draw out no more than what

came

came from a fiſtulous opening: 'Tis a pernicious Practice; it is eaſily conceived that the *Pus*, which takes up its Reſidence in Places ſo ſenſible, can't but produce melancholy Symptoms; that Pains, Fevers, Vomiting and Looſeneſs, irregular Shiverings, and a Reflux of purulent Matter into the Blood, muſt be the Conſequences; and that Impoſthumes in the Liver, the Lungs, and other Intrails, are the Diſeaſes which muſt end thoſe who have been ſo ill-managed.

Again, 'tis obſerved that the expulſive Dreſſings which are ſo beneficial in Practice, can not be made Uſe of to expel the *Pus* that remains in the Cavity of the Joint, beſides the Parts give Way, and yield to the Compreſſion, which is what forces out the *Pus*: Here, on the contrary, the Bones reſiſt, and the *Pus* is ſhelter'd from the Compreſſion in an infinite Number of Corners of the Joint. For this Reaſon, they muſt not only be opened, but there muſt be large Openings made, ſo that they may have Communication with each other, to the End that there may not be any Part nor Crevice of the Joint, but what may be cleanſed by the Injections, and be diſcharged outwards with Eaſe by the Openings. I know that ſometimes the Bones are corrupted, and one is obliged to make them exfoliate, but the Fault muſt not be laid upon the Inciſions, the Continuance of the *Pus* there may be the Cauſe: 'Tis for this Reaſon that I adviſe the opening it in Time, and the giving the Matter a Biaſs by a proper Situation, as alſo the waſhing the Wound with the Injections, as has been ſaid.

Exfoliation may be procured by taking exact Care that the Bones be not again covered with unſound Fleſh, by often laying *Lapis infernalis*

to that which does appear, and applying an actual Cautery, or a Solution of Mercury and *Aqua Fortis*; this Remedy is very efficacious, as ſhall be obſerved in treating of *Exoſtoſes*, and a *Caries*.

'Twould be now requiſite to ſpeak of the *Anchyloſes* (or rather the Diſpoſitions to this Diſtemper) which may be cauſed by the Pox, the Scurvy, or the King's-Evil; but as theſe three Cauſes are common to *Exoſtoſes* and *Caries*, I will treat of this Matter in the ſecond Part, when I ſhall explain the Formation of theſe two Diſeaſes, and give an Account of the Means to cure them, which are the ſame, excepting the manual Operation of the Surgeon, whereof I have ſpoke amply in this Chapter.

A

TREATISE

OF THE

Diseases of the Bones.

PART II.

CHAP. I.

Of Fractures in General.

THE Word *Fracture* is taken Generally, Properly, and most Properly: Generally, for any Solution of the Continuity in the Bone; Properly for a Solution of the Continuity that proceeds from an external Cause; and most Properly, for a Solution of the Continuity that is caused by an Instrument that bruises.

Three Acceptations of the Word Fracture.

These Distinctions are made 1. To put a Difference between a *Caries* and a Solution from an external Cause. 2. To distinguish the Solutions proceeding from external Causes from each other, because these Words, *an Instrument that bruises*, make a Difference between a real Fracture, and a Wound in the Bone, made by a cutting or pricking Instrument.

To treat of Fractures in Order, we will follow as much as possible the Method we laid down in treating of Luxations; thus we have eight Things to know, which are

1. The Structure of the Part in general.
2. The Sorts of Fractures.
3. The unnatural Shape of the Limb.
4. The Cause of the Fracture.
5. The Signs.
6. The Accidents.
7. The Prognostick.
8. The Cure.

Structure

The Structure and natural State of the Limb is absolutely necessary to be known.

1. With Relation to the Bones.
2. With Regard to the Muscles.
3. With Respect to the Vessels.

With Relation to the Bones.

With Relation to the Bones, because there are some Parts where there are two Bones, and others where there is but one: Besides one must know the Solidity of the Bone, its Smoothness, or rather the Inequalities that are on its outside; all which Things, if not known, make one judge amiss of Fractures, and make the Surgeon fall into considerable Errors.

To the Muscles.

With Relation to the Muscles; there are some fractured Parts, round which are a great many Muscles, and others where there are but few, which 'tis requisite to know that one may judge of the various Displacings that happen

to

to the Bones, and the Strength that muſt be uſed to make the Extenſion and Counter-Extenſion.

With Regard to the Veſſels, there are ſome near the broken Bones, of which one muſt not be ignorant, eſpecially when one is to work upon complicated Fractures; and if one would prognoſticate aright in thoſe Caſes where Accidents happen thro' the Compreſſion, or hurting of the Blood Veſſels or Nerves. The Veſſels.

The ſeveral Sorts of Fractures are derived, The different Sorts.

1. From the fractur'd Bone.
2. From the Shape of the fractur'd Bone.
3. From the Cauſe.
4. From the Diſtance of the broken Pieces.
5. From the Diſeaſes or Accidents that attend it.

Fractures may happen to hard or to ſpongious Bones; to long or ſhort Bones, to thick or ſmall ones: And both the one and the other may befall thoſe of the Head, the Trunk and the Extremities. Of the fractur'd Bone.

The Figure of the Fracture is different in almoſt all; ſome are oblique, others Croſs-ways, and there are ſome where the Bones are, as it were, cruſhed in Pieces. Shape of fractur'd Bones.

The Fractures croſs-ways are either unequal, or broken clean off, like a Radiſh without any Inequality. There are other Fractures wherein one of the Ends of the broken Bone is ſhiver'd, forming, as it were, the Mouth of a Flute, or a Nail.

The oblique are of two Sorts, the one have their Obliquity the whole Length, others are broken tranſverſally for ſome Lines, and the reſt is oblique; 'tis alſo ſeen that the ſame Bone is fractured in ſeveral Places. It would be very hard to deſcribe all the Figures of fra-

fractur'd Bones, I don't believe that ever there has been seen two alike.

As to the Fracture length-ways, I believe it imaginary, and fancy that they who have treated of it, have only spoken according to Authors whom they have misunderstood; for *Fabricius ab Aquapendente* has spoken of this Fracture in these Terms: "If the Fracture is the longway of "the Bone, *Galen* says that there are two part-"ticular Indications, the one to replace the "abovementioned broken Bones, *viz.* to adapt "the broken Parts to each other, and re-settle "them in their Places; and the other to keep "them in their right Proportion when re-ui-"ted and adapted. He says that Extension is "necessary to compass the first End, as also "the middling Figure of the Joint, and pro-"per Configuration of the Muscles, *&c.* And "for the second End, which is to keep the "Part entirely adapted, it is done by the "Ligature, which as *Galen* teaches, *&c.*

Opinion of Fabricius ab Aquapendente and Galen.

'Tis evident by what *Fabricius* says upon *Galen*'s Authority, that both he and *Galen* meant by the Fracture longways, what we mean by the oblique Fracture; for altho' *Fabricius* says, in enumerating the different Sorts, that the Bones break cross-ways, obliquely and long-ways; he does not treat of the oblique Fracture, which makes it to be thought, that what he calls a Fracture long-ways, is only that which is most oblique, and that he intended to treat of the one in treating of the other, there being no essential Difference, but only in more or less Obliquity. In Effect, he would not propose making the Extension, because it is plain it is not proper; and he would not enjoin the adapting the Bones, because there is no displacing in a Fracture long-ways, supposing it cou'd

Reflection.

hap-

happen. I ſay, ſuppoſing it cou'd happen, becauſe there is no Blow which cou'd fracture the Bone length-ways, but what wou'd break it croſs-ways with much more Eaſe; beſides this, I have never ſeen it, and great Practitioners, who are Men of Credit, have aſſured me that they never met with an Inſtance of it but in Books. I know very well that Muſquet Balls bruiſe the Bones, and ſplit them long-ways, even within their Articulations; but 'tis not of theſe Sorts of Fractures that we have been ſpeaking. Remark.

The Cauſes generally are all external; nevertheleſs, beſides Blows and Falls, one may add, that there are occaſional and internal Cauſes, which render the Bones more brittle, as is viſibly ſeen in the Pox, the Scurvy, the King's-Evil, and the *Rachitis*. Cauſes.

As to the Diſtance of the Pieces of the Bones, the one are very diſtant, the others leſs, and others not all.

There are two Sorts of Diſplacings in fractured Bones, for the one may be diſplaced lengthways, when the Ends are one above the other; and the other only in their Thickneſs, when they are ſeparated, but not ſo but that ſome Part of the broken Surfaces touch each other. Of the diſplacing of broken Bones.

There are ſome Fractures that are attended with Luxations, Wounds, Impoſthumes, Fevers, Pain, Convulſions, or a Hemorhage; and others have no Symptom, wherefore we ſay there are Simple, Compound, and complicated Fractures. Difference in Reſpect to Accidents or Diſeaſes.

We call that a ſimple Fracture where there is but one Bone broken, without any other Accident than what is uſual in Fractures, and which only indicates one Thing for its Cure. Simple Fracture.

Some

Compound Fracture.

Some are Compound, becauſe at the ſame Time there are two or three Bones broken in the ſame Part, and they are not called complicated, becauſe they only indicate one Thing for their Cure, which is the re-uniting them.

Complicated Fracture.

That is term'd a complicated Fracture which is attended with the Diſeaſes or Accidents beforementioned, which give different Indications, and require various Remedies and Operations to compleat their Cure.

Beſides, a Fracture is called compleat when the Bone is entirely broken, and incompleat when there is ſtill ſome Part of it whole; this is only met with in the Bones of the *Cranium*, thoſe of the Hips, and the *Omoplata*; and if it ſometimes happens to other Bones, it is only in very young Children, or ſuch as have the Rickets.

Unnatural Figure of the broken Limbs.

The third Thing neceſſary to be known in curing of Fractures, is the unnatural Figure of the broken Limb, which is different according to the fractur'd Part; it depends only upon the Situation and Force of the Muſcles, as ſhall be obſerved in treating of particular Fractures.

The Cauſes.

The fourth Thing to be known is the Cauſes; they are (as has been already ſaid) all external, unleſs one adds to them a *Caries Exoſtoſis*, Softneſs, and other Diſpoſitions to render the Bones more brittle, whether in the Scurvy, the King's-Evil, the Pox, or the Rickets, which has been already ſaid in ſpeaking of the Difference of Fractures, with Reſpect to their Cauſes.

The fifth Thing to be known is the Signs, which are Rational or perceptible by the Senſes.

The

The Rational ſerve particularly to diſcover the Fractures of the *Cranium*, whereof we ſhall not ſpeak in this Treatiſe. Signs.

The Signs perceptible by the Senſes are equivocal and univocal; the Equivocal are Pain, and the Impotence of the Limb.

Pain is an equivocal Sign, 'tis known that the ſame Cauſe of Pain produces different Effects, according to the Subjects; whence what is an inſupportable Pain to ſome, is but very ſlight to others leſs ſuſceptible; beſides, we ſee Fractures without Pain, and we ſee great Pain without Fractures. Equivocal Signs.

The Difficulty of moving the Part is alſo an equivocal Sign in Fractures, becauſe it is met with in all Contuſions; and beſides the Difficulty of moving proceeds from this; moſt part of Perſons ſuſceptible of Pain dare not ſtir for Fear of the Anguiſh. Equivocal Sign.

The univocal Signs are diſcover'd, ſome by the Sight, others by the Hearing, and others again by the Touch. 3 Sorts of Signs.

By the Sight, in comparing the ſound Part with that which is affected, whereby we may better perceive its Deformity. The Sight.

In which, however, it muſt be obſerved, that the Parts on the right Side are not always conformable to thoſe of the left, that the Eyes themſelves are not always alike: Some Perſons have been miſtaken for want of asking the Patients, Aſſiſtants, Relations, Fathers or Mothers, if the Deformity that appeared was not of long ſtanding, or even from the Birth. Obſervation.

By the Touch, when one feels the Inequalities cauſed by the diſplaced Bones: In this three Things muſt be obſerved. Firſt, that the Patient be ſituated in the Place where he muſt ſtay during the Cure, and conſequently where the The Touch. Remark.

the Reduction of the Fracture muſt be made. It is unneceſſary, and even dangerous to make Tryals to judge of the Fracture, before he be in this Poſition.

Remark. Secondly, that he be held by ſome ſtrong Perſon, to the End that, if he is put to any Pain in the Examination one is obliged to make to judge of the Fracture, he may be well reſtrained; for the Anguiſh ſometimes forces a Man to make ſuch Motions, as without Doubt, would be very prejudicial on this Occaſion.

Remark. Thirdly, To feel to Purpoſe, and not cauſe unprofitable Pains, one muſt chooſe the Places where the broken Bone is leaſt cover'd with Muſcles, following the Surfaces or the Excreſcencies of the Bones; and if there are any ſharp Ends or Splinters, they muſt be touch'd very gently, that one may not puſh the ſenſible Parts againſt the Points or Edges of the Bones.

The Hearing. Fractures are diſcover'd by the Ear, when the Noiſe is heard that the Bones make, which is called *Crepitation*. To cauſe this *Crepitation*, one of the Ends of the broken Bone muſt grate againſt the other, which happens by moving the Limb; but, to make this neceſſary Experiment with leſs Pain, the upper Part of the fractur'd Limb muſt be held, ſo as it may not ſtir, to the End that in moving the lower Part gently, it may be touch'd by it, and occaſion the Noiſe that is called *Crepitation*.

Remark. Obſerve that this grating which cauſes the Crepitation, may be only perceived by the Surgeon, and him that holds the upper Part, becauſe it is not requiſite that the outward Air ſhould be moved to ſuch a Degree as to ſtrike the Ears; it is ſufficient that their Hands

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are mov'd by the Shock or grating of the fractur'd Bones.

It muſt alſo be obſerved that the Limbs are ſometimes ſo broken in Pieces, that they are known at Sight, ſo great is their Deformity; in which Caſe the firſt Touch ought to be to make the Reduction, it may even be made before the Dreſſings are got ready, if the Caſe is preſſing. It is unneceſſary, and even prejudicial to make Motions to obſerve the *Crepitation*, ſince we are certain by other Means that there is a Fracture.

I ſhall obſerve *en paſſant*, that the *Crepitation* is equivocal, and ſometimes deceitful. I was one Day ſent for to aſſiſt a Perſon that had fallen; I came later than a Bone-Setter, whom I found preparing the Dreſſings for a Fracture of the *Rotula*: Whilſt he was ſo employ'd, I touch'd the Patient's Knee, and not diſcovering any Fracture, I call'd the Bone-Setter, and ask'd him by what he judg'd that the *Rotula* was fractured. He anſwer'd with an aſſuming Air, *Sir, don't you perceive the Crepitation?* No, Said I: He took the Knee, and moving it violently made the Articulations grate, telling me that I might hear it; I hear a *Cliquetis*, replied I, but not a Crepitation. He would maintain his Ignorance or his Knavery; but for all his ſharp and groſs Speeches, which would have affronted me from the Mouth of any other, I choſe Moderation, and favour'd him ſo much as only to accuſe him of Ignorance, which perhaps was not his greateſt Fault. In Effect, can the Crepitation be taken for a Sign of the *Rotula*'s being broken? 'Tis, perhaps, the only Fracture where it can't happen, becauſe the Pieces of Bone muſt touch to make a Noiſe; and in the Fracture of the *Rotula*, the upper

Obſervation.

Remark.

upper Part is always distant from the lower, by the Attraction of the Muscles which draw it upwards.

But, perhaps, some will ask me, whence came the Noise of the Articulation, upon the violent Motion made by the Bone-Setter? I answer, that it is usual when the Joints have suffer'd, and that 'tis more or less perceivable, because the Ligaments are swell'd and shortened, and draw the Bones nearer each other, the *Sinovia* is dispers'd; and 'tis known that the Reason of the Bones rubbing against each other without Noise is, because this Liquor, which lubricates the Cartilages, flows between them.

Another Remark. It must be again remark'd, that when the Bones, tho' fractur'd, have retain'd their Evenness, the Deformity, if there is any, cannot proceed from the displacing of the Bones; therefore this Sign is not infallible. I have known a Bone-Setter sent for to the taking off the first Dressing of a Fracture of the Leg, which had been so perfectly reduced by one of my Brethren, that the Bone-Setter thought there was no Fracture; he had the Impudence to tell the Parents of the Patient so, and perswaded them to it. He took off the Dressing, and gave the wounded Person Leave to get out of Bed, which he did, but had hardly set Foot to Ground before the Bones were displaced, whereupon the Bone-Setter was turn'd off, and the usual Surgeon was again sent for, who was very much surprized at what had passed; I don't know whether, as Devout as he was, it did not sensibly please him to see the Impostor and the Incredulous so punish'd.

Observation.

The Accidents of Fractures The sixth Thing to be known in curing of Fractures, is the Accidents: There are a great Number; the chief are, Pain, an Incapacity of

of moving the Part, a *Pruritus*, an Inflamation, a Fever, a Gangrene, a *Hemorrhage*, Convulſions, the Palſy, an *Atrophy*, Crookedneſs, an *Anchyloſis*, and the Deformity of the *Callus*.

1. The Pain is cauſed by the Solution of the Continuity, and the twitching cauſed by the broken Bones in the neighbouring Parts; and this Pain is greater when the Tendons, Nerves, Membranes, or Ligaments ſuffer.

2. 'Tis not to be wonder'd at if the Limb be impotent, becauſe its Strength depends upon the Muſcles being ſupported by the Bones, which being broke, can no longer help them: Beſides, Motion creates Pain, and the Patient keeps ſtill for Fear of increaſing that he has already, whence he remains quiet, more from a Fear of ſuffering, than want of Power to ſtir. Pain.

3. Sometimes a *Pruritus* or Itching ſeizes upon the fractur'd Parts, thro' the Surgeon's Fault, in uſing unctuous Medicines that ſtop the Pores, hinder inſenſible Perſpiration, and keep in the Matter of the *Glandes Miliares* of the Skin, and of the *Sebaceæ*; this Matter turns ſowr, and irritates the nervous Fibres of the reticular Texture of the Skin, which cauſes little Pimples, or *Herpes Miliares* that are ſometimes followed by an *Eryſipelas* by the Continuance of the Irritation, and often an Impoſthume happens, if the Tumour ſeizes on the whole Thickneſs of the Tegument, becauſe that in a little Time the *Corpus Adipoſum* will ſuffer, and become the Seat of Impoſthumes. Of the Pruritus.

4. The Fever proceeds from the Pain cauſed by the Points of the Bones, or from their hurtful Situation, with Regard to the Parts adjoining, which are very ſenſible; or elſe from the Diſquiet of the Patient, on Account of other Paſſions wherewith his Mind may be agi-

tated,

tated, all these Causes being capable of putting the animal Spirits, and the Blood, in an immoderate Motion.

5. The Gangrene is the Consequence of the Inflamation and swelling, which not being to be asswaged, wholly obstruct the Motion of the Liquors, whence follows Corruption, and the Death of the Patient; which also happens by the Rupture or the Compression of the Vessels.

6. The *Hemorrhage* is caused by the Solution of the Continuity of the Vessels, occasioned by the Points or Splinters of the Bones.

7. Convulsions happen thro' the Compression of the Nerves or Tendons, or else thro' their being prick'd by the Points of the Bones, or some Splinters that are separated from them.

8. The Palsy which comes at first, is the Effect of the violent Compression of the Nerves, and that which happens afterwards, proceeds from Defluxions that fall along the Progress of the Nerves.

9. The *Atrophy*, or falling away of the Part, is not an Accident that happens at the Beginning, but in Process of Time, thro' the weakening of the Nerves and Arteries, which continue compress'd; or else by Reason of the Bandage's being too long bound, together with the Disposition of the Subject.

10. The Crookedness is caused by the Reduction's having been ill made, or by the Patient's not having kept himself in the Position that was enjoined him.

11. The *Anchylosis* comes when the Fracture is near the Joint, and the nutritive Juice or callous Matter has spread in the Neighbourhood of the Ligaments, where it coagulates, and solders (to use that Expression) the Bones in their Jointings: Or else it sometimes hap-

pen-

pens thro' the Perſon's continuing a long Time in the ſame Poſture without moving, whence the *Sinovia* thickens, and produces the ſame Effect as the nutritive Juice beforementioned.

12. The *Callus* is miſhapen from its not having been ſufficiently reſtrain'd by the Bandage, or becauſe the Bones have not been well reduced.

Oftentimes 'tis not poſſible to reſtrain the growing of the *Callus*, eſpecially when the Pain, Inflamation, and other Accidents prohibit the uſing a tight Bandage; but it often happens that the Surgeon himſelf is in Fault, when without any Reaſon he does not bind the Bandage ſufficiently: In this Caſe the nutritive Juice, that muſt ſolder the Bones is not confined; then the Bandage muſt be put on in ſuch a Manner as it may ſufficiently and equally compreſs the Bones, to the End that the Juice may not have an Opportunity to diffuſe it ſelf in the Neighbourhood; and 'tis for this Reaſon that it appears more miſ-ſhapen in the Fractures, where the Bones have not been well placed, both becauſe the Bones which lie one upon the other, occaſion an external Deformity; and becauſe the Bandage can't compreſs equally, nor produce the Effect of which we have been ſpeaking.

The ſeventh Thing neceſſary to be known in managing Fractures, is the Prognoſtick that is drawn from the different Kinds, and according to that we will ſay that the oblique Fractures, and thoſe which are like a Nail, or the Mouth of a Flute, as alſo thoſe that are broken into ſeveral Pieces, are more fatal than the Fractures Croſs-ways. Prognoſtick.

They which proceed only from external Caſes without any internal Defect, are leſs dan-

dangerous than those where the Bones have been render'd more brittle by the Scurvy, the Pox, the King's-Evil, or the Rickets. In all these Cases the bony Juice is not well conditioned, and (far from yielding a Substance capable of hardening, and forming a *Callus*) it destroys the Substance of the Bone it self, and corrupts it, instead of soldering and uniting it.

When the two Bones of one and the same Part are fractured, the Fracture is more dangerous than when there is but one: If the displacing is considerable, the Fracture is harder to cure, than if it is moderate, or there is none at all. If any Accidents happen, the simple Fracture, being turn'd complicate, becomes more dangerous.

The Cure of Fractures.

The 8th Thing to be known is the Method of Cure, wherein Regard must be had to three Intentions, which are, to reduce the broken Bones, to support them when reduced, and to correct the present, or prevent future Accidents. There are some who add a 4th, that is to labour at the Formation of the *Callus*.

First Intention.

The first Intention comprehends three Things, *viz.* Extension, Counter-Extension and Conformation. To make these; first, the Patient must, as near as possible, be situated in the same Place and Position wherein he must remain during the whole Cure.

2. The Ends of the fractured Bone must be drawn with the same Degree of Strength.

3. The Force that draws must, as near as possible, be applied to the two Ends of the broken Bone, and never to Parts that are near it.

4. In putting on the Straps, or placing the Hands that draw, one must remove a little from the fractur'd Part, and choose those Places

ces where the Hands and Straps have beſt hold, as near the *Condyles*, and the Parts where the Limbs being ſmalleſt are eaſieſt to paſs, becauſe theſe Eminences may with-hold the Hands or Straps, and hinder them from ſlipping, which gives them better hold.

5. The Extenſions muſt be proportionable to the Diſtance or diſplacing of the Pieces of the broken Bone, and to the Force of the Muſcles that cauſe the diſplacing, and reſiſt the Extenſion.

6. The Muſcles muſt (as much as poſſible) be in a State of Inaction, becauſe that otherwiſe, to get the better of them, one runs the Hazard of tearing or breaking them, as has been often ſeen, for want of Precaution.

7. It muſt be made by Degrees, for fear of ruining the Muſcles, which would happen if one was to pull forcibly of a ſudden, foraſmuch as 'tis requiſite to give the muſculous Fibres time to yield to the Strength that extends them.

With what the Extenſions are made.

The Way of making theſe two Operations is, with the Hands, Straps, and ſometimes with Inſtruments or Machines.

The Hands alone.

The Hands *only* are to be uſed when the Limbs may be eaſily graſped, and when the Muſcles have no conſiderable Force.

Straps.

On the contrary Straps are uſed, when the Hands can't graſp the Part, nor have Strength enough to maſter the Power of the Muſcles.

Machines.

Laſtly, Machines are uſed when neither the Hands or Straps are ſufficient, whether in Reſpect to their Force, or their Application.

Remarks for well making the Conformation.

To make the Conformation. 1. The Extenſion and Counter-Extenſion muſt be ſufficient. The Uſe of theſe is to remedy the diſplacing of the Bones which happens long-ways, when

they lie one upon the other. Now it is impoſſible to make them conformable whilſt their Sides touch each other, therefore they muſt be drawn upwards and downwards before their Conformation.

2. The Conformation may be made with the Palm of the Hand, the fleſhy Part of the Thumb, or the Fingers; ſometimes even with Inſtruments, as the Trepan, the Elevatory, and others, and that according to the reſpective Caſes.

3. The Force that tends to replace the Bones muſt, as near as poſſible, be ſo placed as not to work upon their Ends, or their Splinters, to the End that one may avoid a Solution of the Continuity, and Divulſions, that would cauſe fatal Accidents.

4. The Strength that is employed in adapting and replacing the Bones, muſt be proportionable to the Solidity of the Bone, the Thickneſs of the Fleſh, and how far it is diſplaced, as to its Thickneſs.

To the Solidity of the Bone, becauſe Bones that are thin reſiſting leſs than thick ones, there is leſs Strength requiſite to replace them.

To the Thickneſs of the Fleſh, becauſe if it is thick, the Force is more diſtant from the Bone, and has leſs Effect.

The Manner of keeping the Bone in its right Poſition.

The ſecond Intention in the Cure of Fractures, is to ſupport the reduced Bone, which is done by the Dreſſings and Poſition of the Part, wherein all that follows muſt be obſerved.

What muſt be done in dreſſing of Fractures.

1. The Dreſſings conſiſt of Compreſſes, Bands, Splints, Paſtboards, Caſes, Straps, Junks, Scarves, Pellets, Medicines, and others, according as is requiſite, in the Application of which, one muſt obſerve, 1. That the Hair be ſhaved.

2. That the Part and the Muſcles be in their Rectitude or Situation.

3. That

3. That they who hold the Part whilſt the Dreſſing is putting on, be ſtrong, and that they be as little conſtrained as poſſible, that they may hold it equally till the End of the Operation.

4. That the firſt Compreſs be ſingle, to the End that the Band may be more eaſily applied, and may be nearer the Part it is to bind and keep in.

5. That the Bands be moderately fine, cut to a Thread, and of Linnen that has been a little worn; that they be ſufficiently long and broad; that the firſt be clapt on immediately upon the fractur'd Place, as near as poſſible, that it makes three Rounds, and goes upwards, ending in Circumvolutions that muſt be neither too tight, nor too ſlack; not too tight, for fear of hindering the Circulation; nor too ſlack, becauſe it won't keep in the fractured Bones.

6. The ſecond Roller ought to have the ſame Qualities as the firſt; it begins at the ſame Place, it is continued downwards, and remounts upwards, according to the Caſes, the Sorts of Fractures, and the different Bones that are broken.

7. The Splints muſt only be thick Compreſſes, after the Manner of longitudinal Bolſters, they muſt be laid on along the Part, in thoſe Places where there is no Eminence nor Excreſcency of the Bone; formerly they were made of Paſtboard, cover'd with a thick Cloath that they might not hurt.

8. There muſt ſometimes be Compreſſes to equalize the Parts, that the third Band, and the Paſtboards may make an equal Compreſſion. There are ſome Parts more ſunk in than others, and theſe Compreſſes ſerve to fill them

up, which makes the whole Part upon a Level, and renders the Application of the Rollers more exact.

9. The Paſtboards ought to be cut in Proportion to the Size and Shape of the Part; they are faſtened with two or three Straps. One begins to tye them at the lowermoſt, if there are but two Straps, or at the middle if there are three. The Number is determined by the Length and Compaſs of the Part.

Poſition of the Part.

After the Application of the Dreſſings, one muſt place the Body and the Part affected: The Poſition of the whole Body is different, according to the various Parts that are fractured.

For the lower Extremities.

In all Fractures of the lower Extremities, and thoſe of the Hip-Bones, the Patient muſt abſolutely be in Bed till the Formation of the *Callus*; he muſt do the ſame in all other Fractures, till the Pain, the Fever, and other Accidents are over, after which he may be taken up, at firſt only to make his Bed, and afterwards he may be left more or leſs in an eaſy Chair to refreſh himſelf.

For the Arm. For the Leg.

If 'tis the Arm or the Fore-Arm, it muſt be hung in a Scarf; if the Leg, it muſt be placed quite extended in Junks, or in a Caſe; and in both the one and the other the three Conditions muſt be obſerved, whereof we have treated amply in the Account of Luxations in general, and which are reducible to three Things, *viz.* that the Part be placed high, ſoft, and ſteady.

It muſt be high, that the Juices being aſſiſted by a Bias, may circulate the more eaſily.

Soft, that the Part may not be hurt, nor the Patient have any Reaſon to ſtir.

Steady,

Steady, becauſe the Re-union can't be made, when the Part is upon a Place that ſhakes and is unſteady.

The third Intention in the Cure of Fractures, is to correct, or prevent Accidents; to compaſs this, and not be ſurprized, the Surgeon muſt viſit the Patient very often, and examine the Parts next the fractured Limb, as the Foot, if 'tis the Leg, the Hand, if the Arm, that he may be aſſured of what paſſes in Reſpect to the Bandage, for thoſe are the Places where its Perfection or Imperfection is diſcovered. It is as it ſhould be, if one finds a ſoft, red Tumour, of a temperate Heat, and without Pain. If the Bandage be too looſe this Tumour won't appear, and 'tis a Sign that, far from being tight enough to ſupport the Bones, it is not ſufficient to compreſs the Blood Veſſels moderately, for this Compreſſion is the Cauſe of the Tumour that appears when the Bandage is tight enough. Perfections of the Bandage.

In fine, when there appears a hard black and cold Swelling, 'tis a Sign that the Bandage is too hard bound, in theſe two laſt Caſes the Dreſſing muſt be taken off, to be put on better. What muſt be done.

A very exact *Regimen* muſt be preſcribed if the Fracture be conſiderable, and attended with any melancholy Accidents. Regimen

The firſt Dreſſing is taken off ſooner or later, according as there is need, which is known by the Accidents; for when there happens to be Pains, Swellings, Inflamations, and others, one is obliged to take off the Dreſſing to clap on another immediately; otherwiſe 'tis left on longer, 'till the eighth Day, if no Accident appears, and even if there was no Swelling at the Time of making the Reduction, and putting on the Dreſſings. For the Dreſſing is

forced to be taken off ſooner than one would otherwiſe, (altho' no accident appear) when the Tumour is conſiderable at the Time of applying the firſt Bandage, and it abates ſo that the Bandage often becomes too looſe the next Morning.

Precautions to be obſerved in taking off the 2d. Dreſſing.

In taking off the ſecond Dreſſing, the ſame Precautions muſt be obſerved as before, and it muſt be put on the ſame Way, binding it a little harder if the Swelling is gone off.

Correction of Accidents.

The Accidents are to be corrected after the following Manner: If the Patient feels any

Pain.

Pain, 'tis not uſually at the Place of the Fracture, eſpecially when the Bones are reduced. Therefore he is relieved by looſening the Straps, the Junks, or the Scarf; by raiſing or lowering ſome Cuſhions, by applying hot Cloths, and making ſome Fomentation, for this Pain often proceeds from ſome very Trifle; other Times it continues, and obliges us to take off all the Dreſſing: One is even forced to uſe Bleeding and Narcoticks, to cure and mitigate it when 'tis violent.

Itching.

The *Pruritus* is prevented by not uſing unctuous Remedies, that are capable of cloſing the Pores. It is taken away by Lotions of Spirit of Wine, and warm Water, and other watery and ſpirituous Fomentations, and by uſing clean Linnen waſh'd in Lye, for Neatneſs is eſſential in dreſſing of Fractures.

Inflamation.

The Inflamation is cured by ſpeedy, plentiful and re-iterated Bleeding, by a mild moiſt *Regimen*, a ſtrict Diet, and bitter Broths; or the refined Juices of Bugloſs, Burrage and Succory, whereunto muſt be added, according to the Caſes, 15 Grains of Nitre into every Doſe of 3 or 4 Ounces, which the Patient muſt take during the Intervalof his Broths.

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His Drink muſt be a light Ptiſan of Dog's Graſs, and Succory Root, and in each Pint which the Patient drinks in a Day, during the Interval of his Broths, he muſt diſſolve a Dram of well purified Nitre.

Fever. The Fever is only the Effect of the Inflamation, or Pain, wherefore 'tis cured by the Remedies that will put a Stop to the one, or mitigate the other.

A Gangrene appearing. If a Diſpoſition to a Gangrene appears, one muſt abandon the Bandage juſt deſcribed, and make uſe of that with 18 Tails. One muſt apply the Fomentations fit to reſiſt Putrefaction, as Spirit of Wine camphorated, *Sal Marine* and *Armoniac*, Aſhes of Vine Branches; the Tinctures of Myrrhe, Aloes, and long and round *Ariſtolochia*, are alſo very good.

A Gangrene form'd. If the *Gangrene* increaſes, Scarifications, Inciſions, and Cuttings muſt be made, as need requires; and if the Diſeaſe give not Way to all theſe Means, the Limb muſt be cut off. See what has been ſaid of the Gangrene in the Chapter of the Luxation of the *Vertebræ*.

Hemorrhage. The *Hemorrhage* is generally found only in Fractures where there are Wounds; nevertheleſs I have ſeen the Artery that paſſes between the two Bones of the Leg, opened by the Edge of a Fracture of the *Tibia* that was broken in the Shape of the Mouth of a Flute, an *Echymoſis* ſpread all over the Leg, and the Part became cold and blackiſh; 'twas thought to be gangrened, I open'd the Leg from 4 Fingers Breadth above to as many below the Fracture, and made an Inciſion as far as, and beyond, the Interoſſal Ligaments, and ſtopped the Flux without diſplacing the Bones; I managed this Diſeaſe like a complicated Fracture, as it was, and cured my Patient.

Ways to stop the Hemorrhage.

It must absolutely be laid bare, to stop an open'd Vessel, that one may compress, bind, or apply Stypticks to it, which are the three Means to stop extraordinary Bleedings.

Ways to cure the Convulsions.

The Convulsions don't continue long, because they are generally caused by the Points of the Splinters that prick the Nerves or nervous Parts, and these Parts are no longer prick'd when the Reduction is made.

Nevertheless there will remain Startings that may be prejudicial when violent; they are allay'd by Bleeding, and the Juices of bitter Plants, with some Grains of dissolved Nitre. When they are yet more violent, add, to these Apozems, some Grains of *Pulvis de Gutte*, and at Night they render them hypnotick by Syrup of *Diacodium*, or the sedative Salt of Mr. *Homberg*.

The Palsy.

The Palsy of the Limb, and its *Atrophy* or Leanness, are cured by Frictions with hot Cloaths, and by spiritous Fomentations that are proper to give Motion to the Blood and Spirits; and as this is not discovered till after the Cure of the fractured Bone, it being solid, one may put the whole Part in the Dregs of Wine or Beer: The Waters of *Bourbon*, *Bourbonne*, and their Mud are also very good.

Anchylosis.

The *Anchylosis* is incurable when the nutritive Juice has taken Possession of the Joint, and is coagulated there; but that which proceeds from not moving the Part, and not dispersing the *Sinovia*, is to be managed as has been said in the Luxations, and the Treatise of the *Anchylosis*.

The Callus.

As to the Deformity of the *Callus*, there is no Remedy when once 'tis formed; this Imperfection is only to be prevented by making a proper Bandage in the Beginning, provided the

Bones

Bones are well reduced, and nothing hinders the uſing the ordinary Bandage.

The Formation of the *Callus* is as eaſy to be conceived, as that of a Scar, being, both the one and the other, the Means whereof Nature and Art make uſe to rejoin thoſe Parts which have ſuffer'd a Solution of their Continuity. Formation of the Callus.

In order to comprehend well the Formation of the *Callus*, one need only call to Mind the Idea of the Structure of the Bone, and the Mechaniſm which Nature uſes to nouriſh it: 'Twill be known that by the Means of the *Perioſteum* the Blood is carried into the Body of the Bone by an innumerable Number of little Arteries, which enter by as many little Holes, and penetrate the Bony Subſtance, to ſupply it with a ſaline and ſulphurous Juice that introduces it ſelf into the Channel of bony Fibres, to repair their Waſting: The ſuperfluous Part of this Piece is taken back by the Lymphatick Veſſels, and that of the Blood by the Veins; both the one and the other are carried to the Heart by the Circulation: This being ſo, 'tis eaſily conceived that this *Lympha*, which is ſupplied by the Arteries, and runs into the Pipes of the long Fibres, diffuſes it ſelf thro' thoſe that are broken, at the Place of the Fracture; and becauſe it don't flow in great Quantity, it congeals at their Ends, when it is naturally, that is, impregnated with ſaline and ſulphurous Principles, which are the Principles of the Juice that are propereſt to congeal, as we ſhall obſerve in the Treatiſe of the *Rachitis*. And to explain how the Circulation is made in this new Part, I ſay that the firſt Drop of the *Lympha*, that flows from each bony Conduit, is thruſt forwards by the ſecond, which divides it to open it ſelf a Paſſage, and is afterwards it Perioſteum.

ſelf

ſelf divided by a third, and the 3d by a 4th, which by a little and little fills up the *Vacuum*, and forms a Pipe thro' which the 5th, and ſo on *ad Infinitum*, preſerve themſelves a Paſſage to introduce themſelves into the empty Spaces, and fill them up. This being thus continued, till theſe congealed Particles have Strength enough to withſtand a new Separation; and the Circumference is ſufficiently fortified that the Liquor can no longer diffuſe it ſelf upon the Sides, and being obliged to follow its Motion in a right Line, enters into Part of the Pipe that is in the other Part of the broken Bone, where it finds the Veſſels diſpoſed after the ſame Manner; and ſo the Circulation begins again in this new Part.

CHAP. II.

Of the Fracture of the Noſe.

Structure. THE upper Part of the Noſe is formed by two little Bones, which joining themſelves together form a Sort of Arch very proper to withſtand external Blows, and which reſiſt ſo much the better, becauſe they are ſupported by the bony *Lamina* of the *Ethmoides*; nevertheleſs there are Blows capable of beating them in, and breaking them different Ways.

Cauſes. For Inſtance, if a Stick, a Stone, or any other Body ſtrike the two Bones of the Noſe upon the Line deſcribed by the bony *Lamina* that ſuſtains them; or if one fall upon ſome hard Body that hits the two Bones upon the ſame Line, a Fracture may happen both to the bony *Lamina* and the Noſe-Bones. Nevertheleſs

'tis

'tis more uſual for one of the two Bones to break, and the other only to ſink in, eſpecially in thoſe the Top of whoſe Noſe is flat.

But there muſt be a Fracture of the bony *Lamina*, provided, as has been ſaid, the Blow be given upon the Union of the two Bones, and on the Line deſcribed by this *Lamina*, altho' there ſhould be but one of the Bones fractured, and the other ſunk in.

This Fracture is with or without Wound; with a Wound inwards and outwards at the ſame Time, or on one Side only. Kinds.

It is eaſy to know the Fracture if there be no ſwelling, but there often is, which hinders our diſcovering it. Signs.

It is not generally fatal; the violent Strokes and Falls upon the Noſe that are without Fracture, are ſometimes much more dangerous, becauſe if the bony *Lamina* reſiſts without fracturing, it cauſes a Commotion in the Brain: Several Patients have died of Abſceſſes in the foremoſt Lobes, and an Effuſion under the *Dura Mater* which covers the *Os Coronale* and *Cribroſum*. Prognoſtick. Obſervation.

Sometimes Impoſthumes are formed within the Noſe, between the pituitary Membrane and the Bones, theſe require a particular Cure.

Mr. Sauret called me in one Day to a Conſultation upon the Diſtemper of one of his Neighbours, who had a little Wound in the Noſe, at the Place where the Bones and the Cartilages are join'd together; the Bone was bare, and there came from the Wound a Spoonful of *Pus* at every Dreſſing: We preſſed the outſide of the Noſe, and the Parts next to it, without getting out the leaſt Drop of *Pus*. I put my Finger up the Noſtril, and felt a ſoft Tumour that diſperſed in Proportion as I made the *Pus* Obſervations.

iſſue

iſſue thro' the exteriour Opening by compreſſing it.

I thruſt in a hollow Probe, fit to make the Operation of the *Fiſtula in Ano*; I carried it into the purulent Bag till I felt it with the Finger that I had in the Noſe, I pierced the pituitary Membrane, and by the Help of the channelling of the Probe, I made an Inciſion therein with a *Biſtouri* ſix Lines wide; there came out again a great deal of *Pus*; I ran a *Seton* from the outſide of the Noſe into the inſide, which I took away three Days afterwards, and the Patient was cured in a little while.

Obſervation. M. *Ruffel* my Brother Member ſhew'd me a like Caſe a few Days afterwards, the ſame Courſe was taken, and 'twas not long before the Patient was cured.

Obſervation. I had practiſed this Operation in two Caſes a little different from theſe two. One was the Conſequence of a *Fiſtula Lachrymalis*, accompanied with an Impoſthume, which extending it ſelf along the Noſe, form'd a little ſoft Tumour in the inſide of the Noſtril, which I preſſed, and which diſcharged it ſelf into the Hole of the *Fiſtula Lachrymalis*; it was propoſed to make an Inciſion from the *Fiſtula* to the Bottom of the Impoſthume, but, to avoid diſfiguring the Face, I adviſed opening it on the inſide of the Noſtril: I did it, and the Abſceſs was dried up in 24 Hours, and the Patient cured in a few Days after.

Obſervation. The other was an Impoſthume, which was the Conſequence of a Blow upon the Noſe, and had formed it ſelf both on the out and inſide; ſo that when it was preſs'd without, the Tumour on that Side diminiſhed, and that within increaſed; and when it was preſs'd on the inſide, the internal Swelling abated, and that with-

without grew larger: 'Twas deliberated on which Side to open it, but 'twas agreed that it ought to be done internally, to avoid the Diſfigurement, and that if Neceſſity required the Opening it outwards, it would be Time enough to do it. Wherefore I opened the Abceſs inwardly, I introduced a Tent, which was ſupported by a Stopple of Lint, and by a Bandage outwards; I applied Lint ſteeped in the White of an Egg beat up with Allum, and a Bolſter and Bandage to compreſs it. There came again out a good deal of *Pus* at the taking off the firſt dreſſing, at the ſecond there appeared leſs, and yet leſs at the third; and by little and little the Patient was cured in 8 Days, without any Thing's being ſeen on the outſide of the Noſe, at the Place where the Fluctuation was ſo apparent, that it might have determined us to open it on that Side, ſooner than on the other. I don't give the Reaſon of theſe Facts, they ſpeak enough of themſelves; what has been ſaid proves that the Fracture of the Noſe is not always without Danger. Speedy Cure.

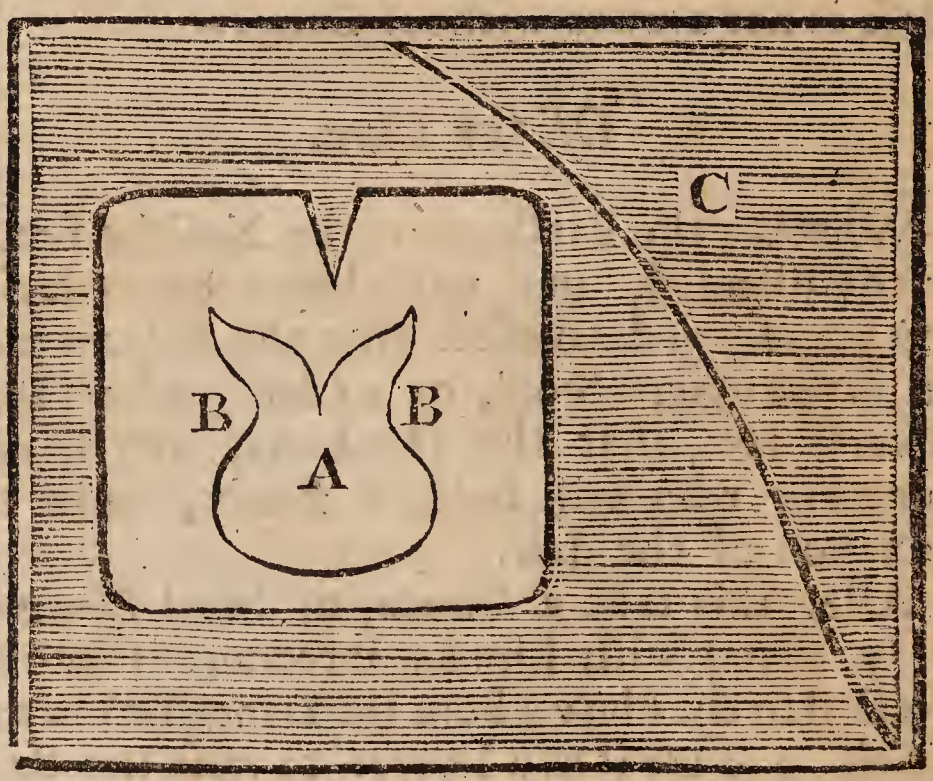
Of the Cure.

Whether the Fracture of the Noſe be ſimple or complicated, one muſt begin by reducing the Bones; and to effect that the Patient muſt be ſeated upon a Stool, or a Chair, whoſe Back is very low, that the Head may reſt againſt ſome one who will hold it ſteady, as in the Luxation of the Jaw. Reduction.

After this take a *Spatula*, or Steel *Elevatory*, wrapt round with Linnen, introduce it into the Noſtril to the Place where the Depreſſion is moſt viſible, and uſe it as a Leaver to raiſe the Bones that are driven in or broken, without Fear of hurting Manual Operation.

hurting the pituitary Membrane, or thruſting the Bones too much outwards, becauſe the Hand that don't hold the *Elevator*, but touches the outſide of the Noſe, is the Director of this Motion, and is attentive (if I may uſe that Expreſſion) to what paſſes.

If this Effort of the *Elevator* don't raiſe both Sides at once, which ought nevertheleſs to happen; one muſt paſs it into the other Noſtril, and do as has been juſt ſaid; then thruſting Stopples into the Noſe ſteept in vulnerary Water, or in good Brandy; cover the outſide with a Compreſs (A) dipt in the ſame Liquor; put on another (BB) which covers the Noſe, the Eyes, and the Forehead: The whole is kept on by a Handkerchief (C) negligently faſtened that it may not compreſs the Noſe, nor particularly the Eyes. The Stopples of Lint that are put up the Noſe muſt not be covered nor made faſt, becauſe they may be renewed by others ſteept and applied in the ſame Manner.



They

These Stopples serve only to keep on the Medicines.

They who devised the putting Linnen Stopples to sustain the Bones, least they should displace themselves, have never reduced any Fracture of the Nose, or they would have learnt that it requires more Force to drive in these Bones that are just replaced, than was necessary to use in raising them with the Elevatory; Things being thus, the Quills to help the Patient's breathing, are equally unprofitable, and I even believe the Stopples must be hurtful. I never used them dipt in vulnerary Water, but as Topicks proper to comfort the Parts that have been griev'd by the Blow, or the *Spatula* that made the Reduction: For this Reason they ought to be very soft, and be left off as soon as the Pain ceases. Remark.

If there be a Wound with the Fracture, it must be dress'd when the Reduction is made; one must bring the Lips near each other, and keep them so with little Compresses supported by the rest of the Dressing, as has been said. Complicated Fracture.

Bleeding, a Diet, Rest, in a Word, a due *Regimen* and the general Remedies are not to be neglected, especially if there be a Pain in the Head, bleeding in the Nose, Heaviness, and other Symptoms, which may be the Effects of a Commotion.

CHAP. III.

Of the Fracture of the Lower Jaw.

Remark. THE Lower Jaw is more difficult to break than a great many other Bones, becauſe its Articulations deaden a Part of the Shock that Blows or Falls may give it; beſides the Teeth which are ſet in it partake of the Shock, and when, by Strokes or Falls they are thruſt againſt the upper Jaw, the Teeth of the one meeting with thoſe of the other, communicate the Motions to each other, which takes off ſo much of the Force that acts upon the Jaw, to break it.

Remark. The broken Pieces ſeparate but a little, ſometimes not at all; and if there is any diſplacing from above downwards, becauſe there are no Muſcles that draw the Ends of the fractur'd Bones over each other, 'tis always the Fore-Part that ſinks by Reaſon of its Weight, and the hind Part that is raiſed by the Influence of the *Maſſeter*, the *Perygoidæus internus*, and the *Crotaptitis*: Thus the diſplacing is not conſiderable, unleſs it be made by the Violence of the Blow, which continuing after the Fracture, ſeparates the Pieces from each other.

The Signs. The Fracture of the Jaw is known by putting ones Hand into the Mouth, the Teeth of one Part will be found not to be in the ſame Line with thoſe of the other; beſides, one may perceive an Unevenneſs without, by running a Finger along the Baſis of the Jaw; but this only happens when there is a Diſplacing.

When

When the Pieces of the Jaw that is broken are not diſplaced, 'tis hard to diſcover the Fracture. To be convinced of it, one muſt lean upon the Fore-Teeth, and thruſt them downwards; and at the ſame Time puſh the Part of the Jaw that is near the Angle, and the *Crepitation* will be heard; but it is not material to know it, ſince there is then no Reduction to be made, and 'tis ſufficient to keep the Jaw in that Poſition.

There are ſome Strokes and Falls ſo violent that the diſplacing cauſes a Deformity viſible to the Eye, ſo that there is no need of feeling.

Prognoſtick.

The ſimple Fracture is not of ill Conſequence, eſpecially, when there is no diſplacing. Fracture without diſplacing.

If the diſplacing were conſiderable, there would be more Danger, becauſe the String of the Veſſels that paſſes along its Canal, would be torn, broken, or ſtretched, which cauſes very ſharp Pains, and may bring Convulſions, by Reaſon that this Nerve is one of the great Strings of the hinder Branch of the 5th Pair, which paſſes along the Canal of the Jaw, to ſupply the Teeth with Branches: There even happens a ruſhing in the Ear, becauſe from the Trunk of this Nerve proceeds the little Branch that croſſes the Skin of the Drum; and the Cheek ſeems benummed, both by Reaſon of the Stroke, and becauſe the little Nerve of the *Maxillary* that paſſes by the Drum, falls into the Trunk of the *Portio Dura*, which diſtributes it ſelf thro' all the Cheek. Fracture with diſplacing.

Beſides 'tis known that the lower *Maxillary* has Communication with the *Portio Dura* co-

ming from the Canal of the Jaw near the Chin.

Accidents. Sometimes Convulsions, or convulsive Motions affect the Lips, and even other Parts, by Reason of the Communication of that Nerve of the 5th Pair with all the other Pairs of Nerves; the Eyes are inflamed by the same Cause. The *Saliva* flows in Abundance by the Compression of the Glands; and these Accidents are the more considerable, when the Jaw is broken nearer the Angle than the Chin.

Of the Cure.

Reduction of the Fracture. In reducing the Jaw when broken, one must observe of what Kind the displacing is: If 'tis in Thickness, 'tis easy to help it, by making the Conformation with the Thumb, which presses upon the Teeth, whilst the Hand runs along the Basis of the Jaw, to level the Inequalities; but if the Pieces of the Bone are got over one another, the Extension and Counter-Extension must be made, which does not seem easy.

Remark. To compass this, one must trim the *Index* of one Hand, and the *Index* and *medius* of the other with Linnen; the Fore-Finger of the one being thrust into the Mouth beyond the farthest Tooth, must serve as a Buttress against the Root of the *Apophysis Coronoides*, and must thrust this Part backwards, whilst the two Fingers of the other Hand being placed under the Tongue, and the Thumb of the same Hand under the Chin, must draw the Fore-part of the Jaw forwards. These two contrary Motions will make the Extension and Counter-Extension, which will remedy the Displacing length-

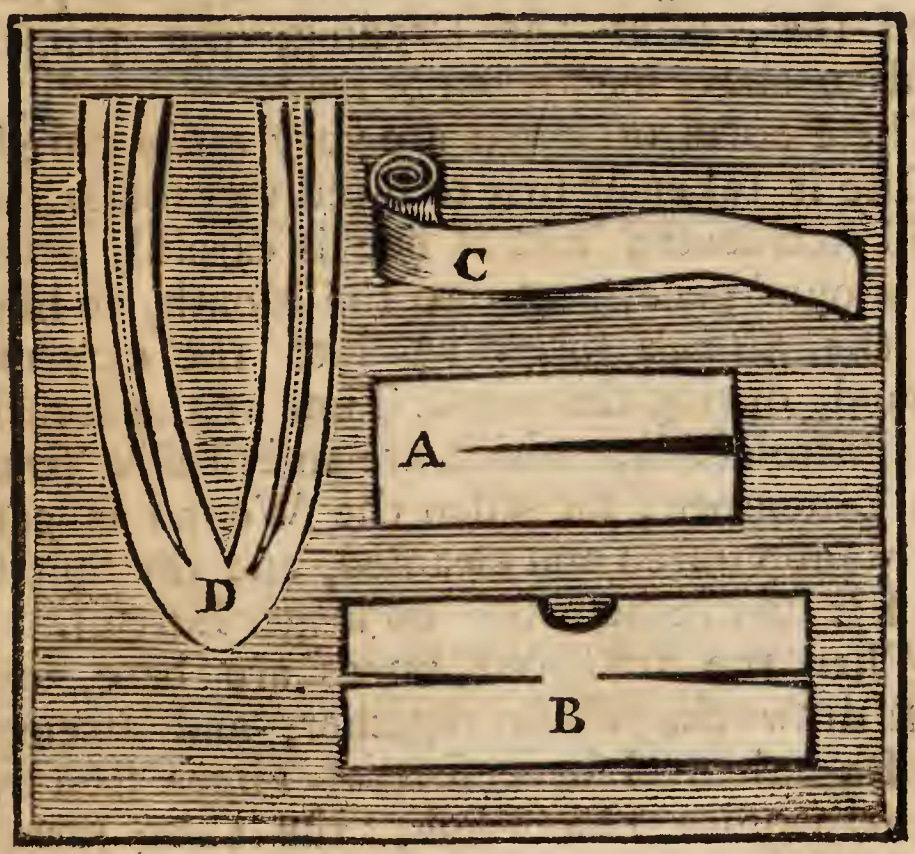
Remark.

length-ways, and then the Conformation will be made eaſily.

When it is done, the Lower Jaw muſt be brought near the Upper one, which will ſerve it as a Splint, provided it is ſufficiently furniſhed with Teeth, and the Teeth anſwer exactly to each other; if not, it is neceſſary to fill up the empty Spaces with Compreſſes, to equalize them, to the End that the Support may be equal and ſufficient. Remark.

The Reduction being made, the Compreſs (A) muſt be laid upon the Part, ſteeped in Aromatick Brandy; after that a very thick Compreſs (B) ſupported by a Band (C) whereof the Bandage called *Cheveſtre* muſt be made, or elſe it muſt be ſuſtained with the Sling, or Chin-Cloth (D.) Dreſſings.

The Patient muſt neither ſpeak nor read, nor muſt he be allowed the Uſe of any Thing but Broth, Jellies, and other liquid Food, which



won't oblige him to move the Jaw. One muſt alſo preſcribe Bleeding, Potions, and other general Remedies.

Of the complicated Fracture of the Lower Jaw.

The complicated Fracture of the Lower Jaw is not hard to dreſs, becauſe one may take off the Dreſſings every Day without Fear of diſplacing the Bones: When they have once been replaced, they keep ſo; becauſe there are no Muſcles that act to ſeparate them. Thus the Wound that accompanies this Fracture, does not require the Bandage with 18 Tails, nor one with a Hole, as ſome Authors have propoſed: I have even dreſſed a great Number of Wounds by Muſquet Shot, where the Jaw was not only broken, but had loſt two Fingers Breadth of its Length, without ever being in Pain for its Diſplacing; it never happens provided that, after the Dreſſing, the proper Bandage above mentioned be made.

Fracture with a Wound.

Theſe Sorts of Hurts are very eaſily cured, if Care is taken at firſt to bleed vigorouſly, to avoid Accidents; and if one is careful, when the Wound penetrates into the Mouth, to hinder the *Saliva*'s ſpreading into the external Wound, during the whole Time of the Stench and Putrefaction, which are inſeparable from this Diſtemper; for when the Wound is perfectly ſuppurated and cleanſed, and the Spittle has loſt its ill Smell, it is no longer hurtful.

Obſervation.

When the fractured Bones are bare, one muſt draw the Fleſh together, and attempt the Re-union. I have ſeveral Times ſeen the Bones acquire new Fleſh, the *Callus* form'd and

Obſervation.

and the Wound cicatrize, without any Exfoliation's happening, more or leſs.

There was a Man who had received a Kick from a Horſe that had been juſt ſhod, and the Edge of the Shoe cut the Fleſh that covers the Jaw, near the Hole of the Chin; and glancing from this Hole towards the Angle of the Jaw, it laid open the Bone that whole Length, and broke it between the laſt Grinder and the *Apophyſis Coronoides*; which according to all Appearance had not happened, if the Foot of the Horſe, which till then had only glanced along the Bone, had not been ſtopp'd by the *Apophyſis Coronoides* of the Jaw. Obſervation.

I made the Reduction, cover'd the Bone with the Shred of Fleſh, and brought the Lips of the Wound ſo exactly together, by Compreſſes, Bandages, *&c.* that the eleventh Day the Re-union of the Wound was made, and altho' the *Callus* was not begun, the Patient ſet out for the Army, whence he wrote me Word a little after, that he had left off a great deal of the *Regimen* I had enjoined him, and that he found himſelf very well after it.

CHAP. IV.

Of the Fracture of the Ribs.

IN this Chapter I ſhall conſider what is capable of breaking the Ribs, and the different Ways they may be fractured, that I may deduce thence the various Means of reducing them.

Fracture of the Ribs with a Wound.

The Cauſes capable of breaking the Ribs, are all bruiſing, but ſome are more ſo than others. Thoſe which are extremely violent, as a Muſquet Ball, or a Shiver of a Bomb, Grenado, *&c.* may eaſily break the Ribs, all-ways, and all-Manners; but, becauſe theſe Sorts of Fractures are then look'd upon as Wounds in the Breaſt; I won't ſpeak of them here, that I may keep wholly to the Examination of thoſe which being without Wound, ought to be deemed only Diſeaſes of the Bones.

Kinds.

The Ribs may be fractured two Ways; they may break ſo as that the fractured Ends may bend towards the *Pleura*, which I call an inward Fracture; or elſe the broken Ends may lean towards the external Muſcles, which I term an outward Fracture.

Internal.

That which I ſtile an internal Fracture, is cauſed by a violent external Blow, which thruſts the broken Ends, and forces them towards the *Pleura*.

External Fracture.

That which happens externally, proceeds on the contrary from the anterior and poſterior End of the Rib's being compreſs'd one againſt the other by Powers diametrically oppoſite, ſo that the broken Ends turn outwards. Thus one may break a Bow by bending it.

Caſes wherein this Fracture happens.

This Fracture happens in two different Caſes.

First Caſe.

The firſt is, when of two Bodies that preſs upon the two Ends of the Rib, one only is in Motion, whilſt the other is at Reſt; as when a Man lying receives a violent Stroke upon the foremoſt End of the Rib, or when a Wheel runs over the Fore-part of a Man's Breaſt, whilſt his Back is againſt the Ground; or in fine, when any one is preſſed againſt the Wall

by

by the Pole of a Coach, or any other ſuch like Thing.

The ſecond Caſe, where the Ribs may be broken outwards, is, when the Powers that preſs the two Ends of the Ribs are both in Motion, as when a Man is ſqueez'd between the Wheels of two Coaches that are driving two different Ways; that is to ſay, when one is going upwards, and the other downwards.

The Manner how

'Twill be eaſily conceived by what I have juſt ſaid, that whether the two Bodies that compreſs are in Motion, or only one of them, if the Compreſſion is made on the Line which paſſes from the End of the Ribs to the *Vertebræ*, the Ribs will approach each other, the Ends will bend; and if they break, the Fracture will be ſo that the middle of their Arch will become more acute, and will throw it ſelf outwards.

All theſe Ways the Ribs muſt be fractured outwards.

Of the Diſplacing.

The diſplacing of the broken Pieces is not conſiderable, becauſe the Fore-part is kept cloſe to the *Sternum*, and the Hind-Part to the *Vertebræ* of the Back. There can be neither any conſiderable diſplacing internally nor externally, and yet leſs upwards or downwards, becauſe the *Inter-Coſtal Muſcles*, which wou'd be capable of cauſing the Diſplacings, draw each of them equally on their own Sides.

Sometimes there is but one Rib broken, at other Time, two, three, or four, and even more.

Signs.

The Signs of theſe Fractures are diagnoſtick, and Prognoſtick; the diagnoſtick Signs are Unevenneſs, Crepitation, Difficulty of Breathing, and Pain.

Symptoms.

As to theſe two laſt Symptoms, they are leſs in the external, becauſe the Ends of the Bones don't

don't prick the *Pleura*. Beſides a leſſer Effort will break a Rib outwards than what will fracture it inwards, becauſe the Blow that ſtrikes externally, falls upon a ſpherical Body, which reſiſts ſo much the more in that the *Fulcrum* of the *Sternum*, and the *Vertebræ* takes off Part of its Force.

Of the Crepitation, a deceitful Noiſe.

The Unevenneſs is never great, becauſe, as we have ſaid, the diſplacing of the broken Pieces is but ſmall. As for the Crepitation, one muſt not confound it with a fallacious Noiſe that accompanies almoſt all Contuſions of the Ribs that are attended with an *Emphyſema*; and 'tis known that in this Diſtemper there always is a hollow Noiſe proceeding from the Colliſion of the Air, that may be perceived by the Touch, but which is very different from that cauſed by the rubbing of two hard Bodies, as are the two Extremities of a broken Rib. I have already ſaid ſeveral Times in this Treatiſe, that the Crepitation and *Cliquetis* might be diſcover'd by the Touch, which perhaps ſeems abſurd, becauſe the Ear is the Organ deſtined for the Perception of Sounds. However it be, if I hold two Nuts in my Hand clench'd, I ſhall be ſenſible of a Crepitation or Rubbing, which will not be perceptible to any one near me, and which I ſhou'd not obſerve my ſelf if theſe two Nuts were rubb'd in the Hand of any other. This is not a Place to give a phyſical Reaſon for it.

Prognoſtick Signs.

The prognoſtick Signs are derived from the various Kinds of Fractures, and Accidents.

As for the Fracture, that which is internal is more troubleſome than that which is external; thoſe which cauſe great Pains, with a Difficulty of Breathing, thoſe which prick the intercoſtal Nerves, or thoſe which open the

Blood

Blood Veſſels belonging to them, are the moſt dangerous.

If the *Pleura* be torn, and one of the intercoſtal Arteries be prick'd by ſome Splinters, and the Blood ſpreads it ſelf over the Breaſt; the Operation of the *Empyema* muſt be made; but if the *Hæmorrhage* be conſiderable, one need not trouble ones ſelf about this Operation, for perhaps the Patient will die before the *Hæmorrhage* be perceived, or before it be determined what Way to ſtop it. However one ought not to be in Suſpence about making an Inciſion at the Place of the Fracture, to get at the Veſſels, and uſe the proper Operations to ſtanch the Blood, whether by Stypticks, Ligatures, or even Compreſſion, tho' this laſt is hard to practice in this Place.

Pleura open'd.

Hæmorrhage.

If this Fracture were at the falſe Ribs, there would be nothing elſe to do but to make an Opening in the Breaſt, conſiderable enough to diſcharge the Blood, but if it were one of the upper Ribs, the Wound muſt be left cloſe, after having ſtopp'd the Blood, and make the Operation of the *Empyema* at the uſual Place, in Caſe there be any Effuſion.

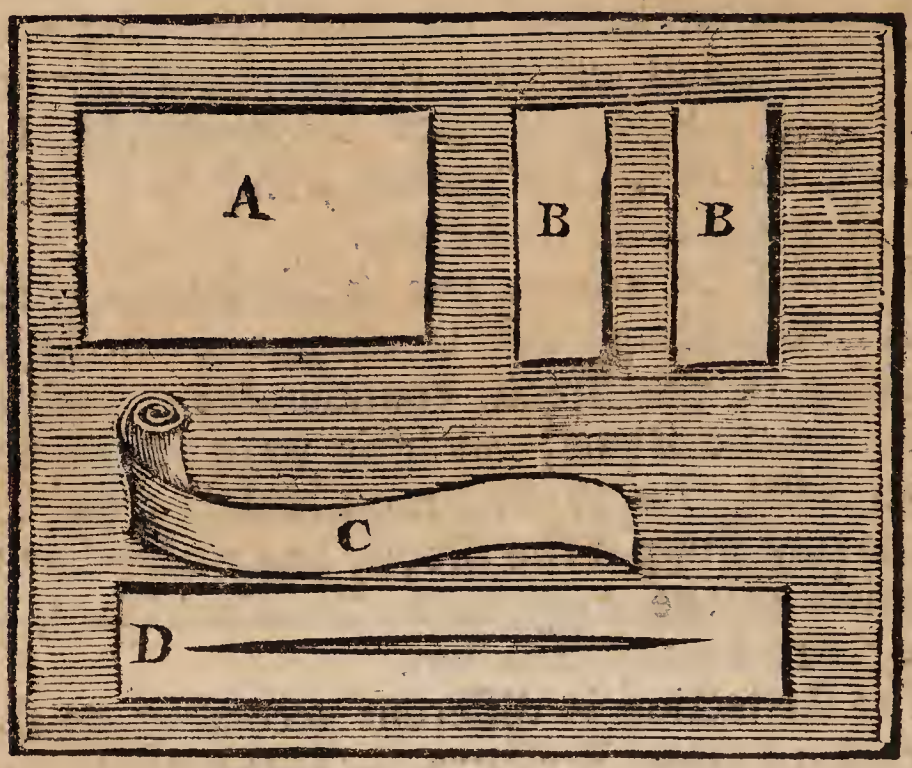
If it is at the falſe Ribs.

The Reduction is different according to the Nature of the Fracture. If the Ends are turned inwards, one muſt do the contrary to the Cauſe that fractured them: Therefore for this Reaſon one muſt preſs with both Hands the Fore-Part againſt the Hind-part, to bring the broken Ends outwards, and ſet them even with the other Ribs. If the Ends are turn'd outwards, which is uncommon, they muſt be thruſt inwards, till they are on a Level with the other Ribs. One muſt not bear upon the Fracture it ſelf, but on both Sides, leaſt the

Reduction of the Fracture.

ſharp Ends of the Bones ſhould prick the Fleſh, which would occaſion conſiderable Pains.

Dreſſings. As for the Application of the Compreſſes and Bandages, whatever the Fracture be, one muſt lay upon it the Compreſs (A) half a Foot ſquare, ſteeped in Aromatick Brandy; the Compreſs (B) muſt be an Inch thick, three broad, and eight long; and they muſt be laid near the broken Ends, in the external Fracture, that they may thruſt them, and oblige them to re-enter into their Places. On the



contrary, when the Fracture happens ſo that the Ends are turned inwards, the Compreſſes muſt be laid upon the Ends of the Ribs, *viz.* near the *Sternum*, and near the Spine, that the broken Parts may be thruſt outwards; and, to retain theſe Compreſſes in this Situation, one muſt faſten them on with Circumvolutions made with the Roller (C) four Fingers broad, and four or five Ells long, which muſt be ſuſtained by the Scapulary (D) faſten'd with ſtrong Pins, or with baſting. I don't know whether the

Pre-

Precaution uſed by certain Bone-Setters in ſewing their Bandages every where and very exactly, would not be proper to be taken, not for the keeping on the Dreſſings, that is needleſs, but to prolong the Time of taking it off. I remember that I had laid a Dreſſing upon a Contuſion in the Breaſt, and had faſtened it on with Pins: A Bone-Setter was ſent for, they came to give me Notice of it, I was not at home, but at my Return I went to the Patient. The Bone-Setter had taken off my Dreſſing, and clapp'd on another, affirming that there were two Ribs broken, and one depreſſed; I was looked upon as an ignorant Fellow. I had my Revenge; I perſuaded the Patient, but with Difficulty (ſo great is the Prepoſſeſſion of People, and ſo hard to conquer) that the Bone-Setter impoſed upon him: A Conſultation was granted; I was juſtified, and the Patient again put his Confidence in me, to which the Bone-Setter's not coming tho' ſent for, contributed not a little. The Patient was cured of his Contuſion in a little Time, and was convinced of the Bone-Setter's Knavery, who had not ſeduced him, if I had ſew'd my Bandage, inſtead of faſtening it with Pins; the Time it would have taken in undoing it, would have given me the Opportunity of getting ſoon enough to the Patient's to have met the Bone-Setter, who doubtleſs had not been eloquent enough to perſuade had I been preſent. I have told this ſhort Story, to ſhew that the Dreſſings may be faſtened with Pins, and that ſowing is only proper when one has to do with Children who may undo their Dreſſings, or when one is apprehenſive of the Knavery, Unpoliteneſs, and Greedineſs of Bone-Setters.

A Story.

For whom the Story is deſigned.

Since

Of the Crack or Cleft.

Since we are upon this Topick, it will not be improper to ſpeak of the cleaving of the Ribs, 'tis a Term they uſe to expreſs an incompleat Fracture: I believe that in this Fracture, Cleaving or Cracking may happen, the Poſſibility of it is demonſtrable: But how impudent muſt he be who dares to averr it? Can he ſhew any Signs of it? By what Senſe can he diſcover it? Is it by the Sight, the Touch, or the Hearing? The Rib is covered; there is no Unevenneſs; by what Signs then ſhall he have Knowledge of it? On this Occaſion an honeſt Man is very much perplexed if he happens to be with a Bone-Setter who maintains that the Rib is crack'd, becauſe if there are no Signs whereby to know that the Rib is cleft, there are none to diſcover that it is not.

Of the Depreſſion.

The Depreſſion of the Ribs is another Diſeaſe with which the Bone-Setters delude the weak Multitude. I don't deny but that the Ribs may be depreſs'd by a Blow, a Fall, or ſome other like Cauſe; but I deny that there is any Operation to be performed for the raiſing them: They remain no longer ſo than during the Blow or the Fall; their Elaſticity with that of the Cartilage and the Muſcles raiſe them immediately, and one ought to treat this Diſtemper only as a Contuſion. I ſhall ſpeak hereafter of the Depreſſion, I only mention it here *en paſſant*.

The Patient muſt be blooded ſeveral Times after the Reduction of the Fracture of the Ribs, eſpecially if the Pain be great; and he finds a Difficulty in breathing, one muſt preſcribe an exact Diet, give Clyſters, Anodyne Potions, and even Narcoticks; in a Word, one muſt make Uſe of every Thing that is capable of diminiſhing the Quantity, and abating the

Motion

Motion of the Blood. All this being founded upon one ſole Principle, which is that the Breaſt is the Work-Houſe or Manufacture of the Blood, 'tis there that it is attenuated and ſubtiliz'd by the Reſpiration; therefore the leſs Blood there is, the leſs Force is neceſſary, and the leſs frequent is the Reſpiration, for which Reaſon the Blood muſt be diminiſhed by Bleeding and Diet. The more its Motion is quieted, the more eaſy and ſoft will be the Breathing; the Muſcles of the Breaſt will be the leſs in Action, and the broken Ribs will be the more in that State of Tranquility that is proper for their Re-union. Clyſters are uſeful, both becauſe they evacuate the *Abdomen*, and free it from the tainted Matter that might get into the Blood, and becauſe the *Diaphragm* can more eaſily lie even towards the *Abdomen*, when it is empty, which renders the Breathing freer and leſs conſtrain'd. The Patient muſt be placed half upright in his Bed, that he may breathe the eaſier, and he muſt not ſpeak, nor do any thing that is capable of increaſing the Reſpiration. The Bandage muſt not be taken off till it becomes too looſe, or incommodes the Patient.

Remedies.

Poſition.

When the Dreſſing is to be taken off.

The moſt grievous Accidents in this Diſeaſe generally end in 12 or 15 Days, and at the Expiration of 30 the *Callus* is form'd entirely.

General Events.

CHAP.

CHAP. V.

Of the Depreſſions of the Ribs.

Whether the Ribs ſink.

'TIS not to be doubted that the Ribs are depreſs'd; I have already ſaid it, but one muſt be either very ignorant or knaviſh to affirm that they will keep ſo without being fractur'd: The Ribs are depreſs'd (that is to ſay) that one or two Ribs may be thruſt inwards, and in that Senſe not be upon the Level with the Ribs next to them. When this happens by ſome Blow or Fall, they recover of themſelves, and reſume their Level, as ſoon as the Bodies that ſtrike, or whereon they fall, no longer act upon the Place that is depreſſed; therefore 'tis either out of Ignorance, or to impoſe upon the Publick, that theſe Gentlemen abuſe the Credulity of the People, by making them believe that they have raiſed the Ribs of Perſons who at moſt had but Contuſions; they even make no Scruple of pretending there are Fractures where there are not, calling, as a Witneſs to confirm it, the fallacious Noiſe that accompanies the *Emphyſema*.

What the Depreſſion is.

Bone Setters.

What guides them in their Prognoſticks.

They hardly ever foretell the Danger of a Diſeaſe from the greatneſs of the Diſtemper; the mean and ſimple Aſpect of the Patient directs them more frequently; every Stroke, every Fall ſupplies them with a Subject for a Miracle, which they render to their own Advantage more or leſs Great according to the Simplicity of the Patient: One ſhall have his Bones ground to Powder, or broken into a Thouſand Pieces, who if he were of another Phyſiognomy would have but a ſimple Fracture,

ſture, or a Depreſſion, a Man of Senſe, or who is thought a Judge, ſhall come off for a ſtarting of the News. The following Story will confirm it.

A Bone-Setter was ſent for 12 or 15 Years ago to look after a Perſon who had fall'n from a Horſe, and ſaid he had broken his Ribs, the Bone-Setter coming found it no hard matter to make it believ'd that the Ribs were broken, tho' they were all whole, becauſe the Cries of the Patient, and the Pain he ſaid he felt, had already eſtabliſh'd it as a Truth in the Minds of all the Aſſiſtants, who judged of the greatneſs of his Hurt, by his Cries. Obſervation.

He dreſs'd the Patient as for a Fracture and Depreſſion, but the Pains neither ceas'd nor abated, a Fever ſeiz'd upon him, attended with reachings to vomit, and the Jaundice with all its Symptoms; and the Patient being reduced to the laſt extremity, loſing the implicit Confidence he had repos'd in the Bone-Setter, had recourſe even to thoſe whoſe Counſel he had neglected taking. Ill management of a Bone-Setter.

I found upon him a very great Difficulty of Breathing, a violent Cough, a ſpitting of Blood, with his Urine of a brick Colour, and his Looks wild; it was the 17th Day of his Fall.

The Bone-Setter having left the Patient on my coming, I cou'd only know what had been done from the Aſſiſtants, who told me almoſt exactly what I have related, excepting that they were perſwaded that the Patient's Ribs were broken, and that all his illneſs proceeded from their not having been well Set: A ſort of Juſtice they did the Bone-Setter, and real Surgeons.

I took off the Bone-Setter's uſeleſs dreſſings, and examin'd the place affected attentively, In what Condition I found and the Part.

and found an *Oedema*, but not the leaſt ſign of a Fracture, not even the firſt formation of a *Callus*, which made me look elſewhere for the Cauſe of the Symptoms wherewith the Patient was afflicted. He had fall'n upon the five falſe Ribs of the Right Side, the Skin was a little ſwell'd, accompany'd with a conſiderable Fever, Redneſs, Hardneſs, and ſuch a ſharp throbbing Pain, that I did not at all ſcruple to ſay, that a purulent Matter was forming, and that there already was ſome, but it lay too deep to be perceiv'd by the Touch, the rather becauſe I ſuſpected the Defluxions being under the Ribs, perhaps even in the Liver, or at leaſt in that part of it that join'd to the Diaphragm.

Having told my Sentiments, two things were requir'd of me: Firſt to give a Reaſon for the Symptoms of the Diſtemper, and ſecondly to preſcribe what was neceſſary to cure it.

My Sentiments upon the Diſeaſe.

To comply with the firſt, I ſaid, that the Ribs not being broken, the Diſorder proceeded from a violent Contuſion of the Liver, occaſion'd by the fall upon the falſe Ribs, which Contuſion had not been ſo great, had the Ribs been broken, nor had it been attended with ſuch ill Conſequences, but for the ill management of the Bone-Setter, which was faulty in three things.

Three Faults of the Bone-Setter.

Firſt, in that he had clapt on a Sear-cloth, a Medicine that prevents Perſpiration:

Secondly, this Sear-cloth was kept on by Bandages that were too tight, which oppreſſing the Breaſt hinder'd the Breathing.

Thirdly, he had not blooded the Patient, as he ought to have done, not only to mitigate the Pain, but alſo to avoid the Defluxion, which I already believ'd at ſuch a height, that

the

the letting blood then cou'd at moſt but abate the Obſtruction of the neighbouring Parts, to prevent a Gangrene, which never fails attending the Suppuration of this ſort of Defluxions, a Gangrene ſo fatal and ſo ſwift, that it carries off the Patient before the Maturity of the Impoſtume.

The ſecond Thing that was deſired, was the moſt requiſite, 'twas to propoſe means to heal this fatal Diſeaſe, wherein the Gangrene was yet more to be feared than the Impoſthume, becauſe it gave no Time to deliberate. My advice was to bleed the Patient, and repeat the ſame as often as his ſtrength would permit; to apply all over the Hurt a Cataplaſm made with the Pulp of Emollient Herbs, and Anodynes, obſerving a proper Drink, Diet, and other things convenient. I went back to *Paris*, the Day following I found the Patient much better, I bled him again, and order'd it to be repeated at Night, and that the Cataplaſm ſhould be continued, which had ſoftned the Part already ſo much that I cou'd feel the Interval between the Ribs; I found them at a greater diſtance than in their natural Condition, and carrying my Fingers under the Cartilaginous ſide of the Ribs from the Cartilage *Xiphoides* to the End of the laſt Rib, I felt a conſiderable hardneſs, and the Patient felt very ſharp Pains. The next Day I found all the outſide much eaſier; and perceiving that there was a hollow Fluctuation near the laſt of the falſe Ribs, I propoſed opening the Abſceſs: 'Twas oppos'd, the Danger ſeem'd to leſſen, and the Confidence of the Patient diminiſh'd alſo, whereas in Perſons of good Senſe it ought to have produced a contrary Effect. I went then no more to ſee

Method of Cure.

The Operation propoſed.

him, and I was inform'd that a Mountebank, *a great purifier of the Blood*, had worm'd himself into his good Opinion, by promising to make him void the Impofthume by Urine. Having made use of these Remedies for Fifteen Days without any Relief, He had again recourse to me. I cou'd not refuse visiting nor taking Care of him, and I found such long and violent suffocations upon him, that I was afraid of seeing him expire in my presence; I touch'd the Part affected, which I found much alter'd, the Tumour that lay hid under the false Ribs was turn'd external, and the Fluctuation was as manifest as in the Dropsie *Ascites*. There was also a Pulsation like that of an *Aneurism*, which did not prevent my proposing to open it, because I had already open'd Tumours of this Nature, which had taught me that whoever in a like Case are apprehensive of opening an *Aneurism*, their Fear is ill grounded.

The Operation made.

Having first made a Prognostick to the Parents, wherein I shew'd them the little Hope there was of a Cure, and that the only means to save the Patient was to open the Abscess, I lanc'd it, and the first Day I drew out two Pints of *Pus*, the next Day there came out a Pint, the subsequent Days to the number of Seven, the Matter diminish'd continually, and some of the Symptoms, but the Vomiting and Looseness, Fever, stoppage of Urine, Tumours, and Dropsy, carry'd off the Patient the 27th Day after the Operation.

The Patient dies.

The Corpse open'd.

I open'd the Corpse, and observ'd that the Abscess was between the Liver and the *Diaphragm*, from its nervous Center to the Place where this Muscle is fasten'd to the last of the false Ribs; the Suspensory Ligament was destroy'd, the Superficies of the Liver ulcer-

ated

ated almoſt the whole extent of the Abſceſs, the *Diaphragm* ſtuck to the Ribs, and to the inferiour Lobe of the Right Lungs; there was a Pint of purulent Water diffuſed over the Breaſt, and all the Ribs were entire, without any appearance of a Fracture, or *Callus*.

It may be remark'd, in this Obſervation, that there being no Fracture in the Ribs, the Contuſion of the Liver was the eſſential Part of this Diſeaſe, and that it only became mortal thro' the Ignorance of the Bone-Setter, who neglected bleeding, and clogg'd the breathing by Bandages which had been too tight, even if the Ribs had been fractured; thus by this ill management the Impoſthume was cauſed.

Nevertheleſs the Patient might have been cured in ſpite of all theſe miſtakes, if, inſtead of giving Credit to the ſecond Mountebank, they had let me lance it when I firſt propoſed it; 'twas the time that the *Pus* began to diſcover it ſelf, it had not as yet cauſed all the Diſorder, and one might with ſome probability have hoped for a Cure.

This is not the only Obſervation I cou'd relate, but 'tis one of thoſe that proves beyond Queſtion, the Danger of hearkening to theſe vain, preſumptuous Perſons, who cloak their Ignorance under a talkativeneſs, or elſe under an artful ſilence, which is always attended with the vain and ſeducing promiſe of Curing. Reflexion.

CHAP. VI.

Of the Fracture of the Sternum.

THE *Sternum* may be forced in and broken by ſome violent Blow; it is liable to Accidents almoſt like thoſe of the Ribs; 'tis even ſeen ſometimes that an inward *Hæmorrhage* happens by Reaſon of the Arteries, and Veins of the Breaſts that lye under it, but this is only in great Fractures, where the Bones, being conſiderably thruſt inwards, tear or cut the Veſſels.

Diagnoſtick and Prognoſtick.

The Fracture of the *Sternum* is ſometimes hard to be known; becauſe in a little Time there comes ſuch a ſwelling as diſguiſes the Diſeaſe, and prevents its being diſcover'd by the Touch; however it is dangerous not to find it out at firſt, for 'tis often in vain to wait for the end of the Tumour, and other Accidents; they are ſometimes ſo fatal, that the Patient expires before they diſappear, in ſpite of all the Aſſiſtance that can be given him. I once open'd the Body of a Man that dy'd of this Diſtemper, who had a Gangrenous Swelling that took up the whole external part of the Breaſt and Neck up to his Chin; I found that the ſecond Bone of the *Sternum* was thruſt in, and compreſs'd the Heart, that there was abundance of bloody Water in the *Pericardium* and the ſides of the Breaſt.

I have

I have obſerv'd that a Man is ſubject to a dry Cough, with a Palpitation of the Heart, and difficulty of Breathing, after having the lower part of the firſt, and upper part of the ſecond Bone of the *Sternum* forced inwards; becauſe the Depreſſions not having been raiſed, cauſe an internal ſwelling and clog the Reſpiration. Obſervations.

Spitting of Blood, violent and frequent Coughing, Suffocations, and a Fever are Symptoms almoſt inſeparable from the Fracture of the *Sternum*. Symptoms.

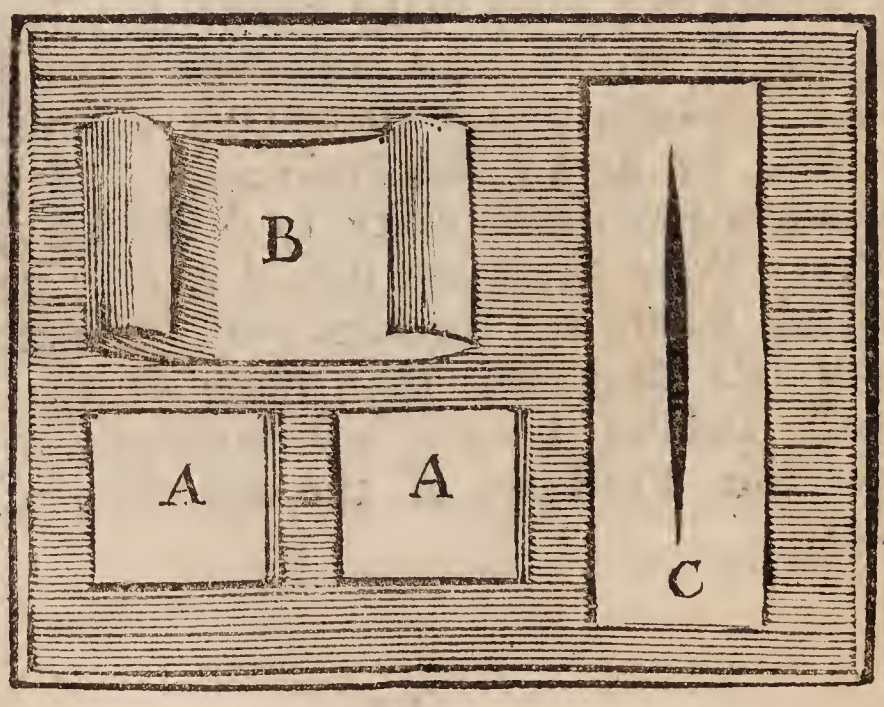
Where the Pain and other Symptoms continue after the Reduction of the Bones, an Abſceſs will be form'd under the *Sternum*, the Perſons ſpit purulent Matter, and have all the Signs of the *Peripneumonia*. It is therefore of great importance to diſcover and reduce this Fracture, and if 'tis impoſſible to ſucceed with the Hands, one muſt not heſitate at making an Inciſion upon the Place affected to find out the Fracture and raiſe the Bones with the *Elevator*, Trepan, or other Inſtruments. Error in Practiſe. Remarkable Operation.

The Example of Fractures in the *Cranium* authoriſes us; they make crucial Inciſions to diſcover them, 'tis not a fault even if one don't find a Fracture, on the contrary it relieves the Patient, by giving the *Pericranium* and other Teguments an opportunity to diſcharge themſelves. Why therefore ſhould a Part be reſpected, where the Inciſions are in themſelves much leſs dangerous than thoſe of the *Cranium?* Beſides it is not leſs important to diſcover the Fractures of the one than of the other. Parallel of the Fractures of the Cranium.

The Cure.

Operation. To raiſe the *Sternum*, the Breaſt muſt be preſs'd from Right to Left, and from Left to Right, which obliges the Ribs to advance forwards, and raiſe the *Sternum* by thruſting out their Cartilages: If this way is inſufficient, and the Accidents are fatal, there is no danger in making an Inciſion, and raiſing the pieces of Bone, as has been ſaid; and even if an Abſceſs were form'd under the *Sternum*, for want of remedying it at the Beginning, the Trepan may be apply'd; as is done to the *Cranium*, to diſcharge the *Pus*, or even the Blood, and raiſe the pieces of Bone that are forced in.

Dreſſing. The Dreſſing is very plain; for the ſimple Fracture there is only need of two Compreſſes (AA) ſteep'd in Aromatick Brandy, and a Body-bandage (B) ſupported by a Scapulous (C.) And if one has made an Inciſion or Trepan, the Wound muſt be dreſs'd, as it ſhould be otherwiſe, always uſing Compreſſes, a Body-bandage, and the Scapulary.



CHAP. VII.

Of the Fracture of the Oſſa Ilia and Pubis.

THE *Oſſa Ilia*, and *Os Pubis* ſeldom break; I have often ſeen both the one and the other happen to Soldiers, who, being blown up by Mines, fall down again upon the Guns, or other hard Bodies: The moſt part of theſe Fractures were without Wounds. Thoſe with Wounds are very common in the Army, by Musket-ſhot and other Fire-Arms, we ſhan't mention them in this Treatiſe. By Mines. By Fire-Arms.

The *Oſſa Ilia* may be fractured different ways; if they are broken Croſs-ways, the Creſt of the *Oſſa Ilia* is removed from the reſt of the Bone, becauſe the *Glutæus Major* and *Medius*, which are ſtronger than the *Iliack* Muſcle, carry the broken part on their ſide, and the oblique Muſcles of the *Abdomen* have not force enough entirely to oppoſe it. Several Ways of being broken.

The Fracture is hard to diſcover when there is a ſwelling, and 'tis ſeldom that there is not one, becauſe a Blow that will break ſuch a Bone, muſt make terrible Contuſions on the Muſcles, Membranes, and *Aponeuroſes* of thoſe Parts. Signs.

When there is no Tumour, the Fracture is eaſily found out by the Touch, and the Crepitation, which one muſt not confound with the noiſe of the *Emphyſema*. Signs.

The Accidents that attend this Fracture are Pains, at the Part affected, occaſion'd by the Contuſion, and by the tearing, the Prickings Symptoms.

and

and other Divulsions that are made by the Inequalities of the broken Bones.

The Belly becomes stretch'd, inflam'd, hard, and bound, and the Gripes, the Hickup, Vomiting, Stoppage of Urine are generally the Consequences.

Prognostick.

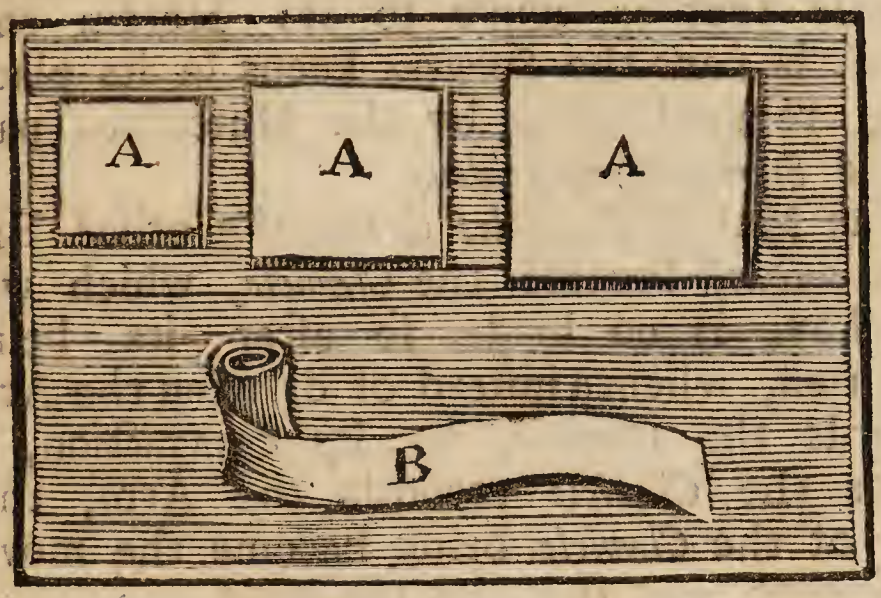
'Tis more difficult to retain the Bone, than to reduce it; the Danger is great when the Accidents above mention'd meet, especially if the Patient's Pulse be low, and his extremities cold.

Observation. Death is unavoidable if in his Vomitings he brings up a Matter like Chocolate: This Matter, which is nothing but the Blood congeal'd by the *Menstrum* of the Stomach, shews that some Vessels are broken in that Intestine: I have never known any recover that had this Symptom; and it mostly comes after a stroke upon the Region of the Stomach, the Reason is easily conceiv'd.

Of the Cure.

Operation. To make the Reduction, the Patient must be plac'd on the Bed-side, lying on the side opposite to the Fracture, having two Pillows, upon one of which the upper Part of the Body must rest, and upon the other his Thigh, Leg and Foot, so that the Part opposite to the Fracture is not supported by any Thing, and the fractur'd side is bent, that the Muscles of the *Abdomen* and the *Glutæi* are sufficiently relax'd, and the Reduction of the fractured Piece may be made with the Hands. After the Reduction, the broken

broken Bone muſt be fix'd with two or three Strong Compreſſes (AAA) dip'd in Aromatick Brandy; they muſt reſt upon the diſplaced Bone to retain it in its right poſition, and muſt extend along the Belly and the Thigh. They muſt be kept on by the Band (B) four or five Ells long, and four Fingers broad.



If general Remedies, and eſpecially bleeding are neceſſary in any Diſtemper, 'tis in this. One muſt make uſe of every thing to prevent the Inflamation of the *Abdomen*, which is a terrible Accident.

CHAP. VIII.

Of the Fracture of the Clavicle.

THERE is no Fracture more ſubject to diſplacing than that of the *Clavicle*, becauſe it cannot be broken but by an external Blow, which thruſts and forces the Pieces towards the Breaſt, and that moreover the weight Remark.

weight of the Arm carries one of the Pieces downwards, whilſt the other is rais'd upwards by the Muſcles.

It is diſplaced length-ways and breadth-ways; the Cauſes of its being diſplaced breadth-ways are ſtrokes, and the weight of the Arm which draws the Shoulder downwards, and conſequently that part of the *Clavicle* that is join'd to it: Herein that which is next the *Sternum* keeps in its place, being retain'd there by the Muſculous part of the *Sternoclinomaſtoideus.*

Diſplacing. The Muſcle *Deltoides* draws the other End downwards, becauſe the *Clavicle*, which was the Stay, is no longer ſo after its being fractured, whence inſtead of drawing the Arm towards the *Clavicle*, by its contraction, it draws the *Clavicle* towards the Arm, that part of the *Clavicle* being become the moveable point, and the Arm the fix'd one.

Diſplacing. It is diſplaced length ways, becauſe the Arm, being no longer ſupported by the Clavicle, falls upon the Breaſt: 'Tis known that in its natural ſtate the *Clavicle* ſerves as a Stay, and keeps the Arm at a diſtance from the Breaſt, that it may move with Eaſe; therefore when 'tis fractur'd it can no longer ſerve for this purpoſe, and the Arm being no more kept outwards muſt fall upon the Breaſt, the rather by reaſon that the *Omoplata* and the Arm are drawn on this ſide, the one by the little, and the other by the great *Pectoral*, which drags the End of the *Clavicle* that is join'd to the *Acromium*, and makes it paſs under the End that is join'd to the *Sternum.*

Signs. The Signs whereby to know this Fracture, are the ſame with thoſe we have given in general

general for all; but there is one more certain, that is, the fall of the Arm upon the Breaſt.

The Cauſes are Strokes, Falls, and violent Motions. Cauſes.

The Prognoſtick is the ſame as is drawn from other Fractures in general: One may ſay moreover that the *Clavicle* is more eaſily broken than the other Bones, both becauſe external Blows have more Power, (as it is ſituated parallel with the Horizon, and moſt part of the Strokes which one receives fall perpendicularly upon it) and becauſe it is neither cover'd with Muſcles nor Fleſh that can deaden the Blows. A ſolid Body cou'd hardly be better placed than the *Clavicle* to be broken; it reſting only upon its two Ends, whilſt the remainder of it has no ſupport at all. Remark.

The Fracture of the *Clavicle* is eaſy to be reduced, becauſe the Extenſions are not hard to be made, and becauſe it being leſs cover'd with Muſcles, is leſs difficult to touch and graſp with the Fingers, eſpecially in ſuch as are lean. Remark.

It is harder to keep in its place than other Bones, for three Reaſons.

Firſt, Becauſe it is ſmall, and the Ends that are reduced touch but by a very little Surface.

Secondly, The Bandage can't ſurround the Bone, as in the Arm, or Leg, and it is difficult to place Compreſſes; and even they, if one is not very careful, thruſt in the Pieces of the Bone, and produce an Effect almoſt like that which caus'd the Fracture.

Thirdly, The Arm and the Muſcles ſeem continually to draw the *Clavicle* towards the *Sternum*, unleſs one takes the Precautions which we ſhall lay down in the Cure hereafter.

To

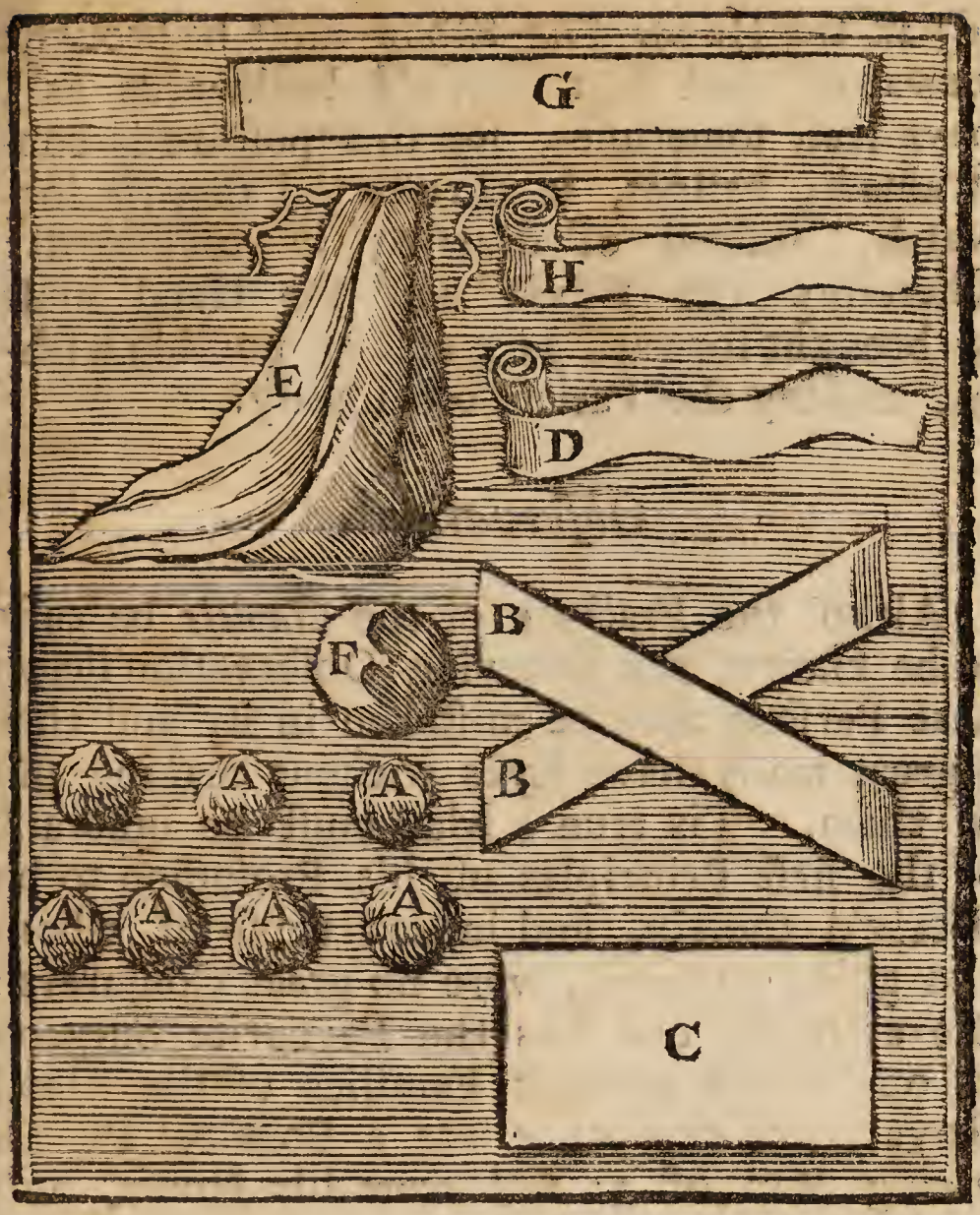
The Cure To reduce the *Clavicle* when broken, the Patient muſt be ſeated on a low Chair.

A Servant muſt ſet his Knee upon the Spine, between the *Omoplatæ*, and take the two Shoulders, that is to ſay, the Ends of the *Omoplatæ*, and the Arms with both Hands, and, having placed himſelf conveniently at a proper height, he muſt draw the Shoulders equally backwards, whilſt he thruſts the whole Body forwards with his Knee, which makes the Extenſion and Counter-Extenſion.

The Surgeon ought to ſtand before the Patient, and when he perceives that the Servant has made the Extenſion and Counter-Extenſion, he brings near and adapts the Ends of the *Clavicle* with his Fingers; and in putting on the Dreſſings, he appoints a ſecond Servant to keep the Bones thus join'd together, whilſt he performs the reſt of the Operation.

But when the Bones have no Stay, and can't be kept right, I lay on a longitudinal Bolſter (G) two thirds of an Ell long, and two Fingers broad; then over it I make a Figure of 8 with the Band (H) 3 Ells long, and two Fingers broad. The Croſſing of the Figure of 8 muſt be between the Shoulders, and the two Circles muſt turn round the Ends of the *Acromion* on each ſide, ſo that this Bandage keeps the Shoulders backwards, and does the ſame thing as is before mention'd in making the Extenſions.

After the Application of this Roller, the Stopples (AAA) muſt be clap'd on to fill the Hollows, wherefore one muſt prepare ſeveral (AAA) being made of Lint or Tow dip'd in the White of an Egg: Over theſe I lay the



the Crucial (BB) cover'd with the Compreſs (C) and the whole muſt be kept on by the deſcending Bandage *Spica*, made with the Roller (D) 5 Ells long and 4 Fingers broad. After this the two Ends of the longitudinal Bolſter (G) muſt be turn'd back over the Breaſt; the one from the Right ſide to the Left, and the other from the Left to the Right, contrary-ways to each other, and one muſt faſten them with ſtrong Pins. Theſe two Ends thus revers'd contrary-ways hinder the Figure of 8 from ſlipping backwards, and ſecure the whole Bandage. Then the Arm muſt be placed in a Scarf (E) and the Pellet (F) in

(F) in the Hand. The Elbow muſt be brought forwards, and not carry'd backwards as I have ſeen ſometimes, for this poſture is conſtrained; beſides, it thruſts the *Clavicle* forwards, inſtead of drawing it backwards: Therefore the Elbow and the Hand muſt be brought forward as much as poſſible without making the Patient too uneaſy.

Obſervations.

Altho' the Fracture of the *Clavicle* be eaſy to be known, the following Obſervation ſhews that Perſons may be miſtaken in it, and that a great many have Eyes without making uſe of them. 'Tis true a Man muſt be ignorant of the firſt Principles of his Profeſſion to be deceiv'd therein, and indeed thoſe of whom I'm going to ſpeak, were no great Conjurers: Nevertheleſs one was the Favourite Surgeon of one of the greateſt Families of the Blood Royal, and the other was a Bone-Setter. A young Man of 22 fell from his Horſe, and bruis'd the End of the *Acromion* which produced an *Ecchymoſis*; he was blooded ſeveral Times, and had Compreſſes ſteep'd in Brandy laid upon the Part, which Cured him.

A little after he diſcover'd a ſwelling on the middle of the *Clavicle* on the ſame ſide, which pain'd him very conſiderably; one of my Brethren, whom he conſulted, found out his Diſtemper; but the Patient wou'd not give credit to him; he went to the Surgeon that had been recommended, who was of Opinion that he had broken his *Clavicle* in his fall, and that, his Surgeon not having diſcover'd it, it had clos'd again of it ſelf, which had occaſion'd a Deformity in the *Callus*. After this

the

the Young Man had recourſe to a Bone-Setter, who told him that his *Clavicle* muſt be broken again to replace it better; he came thereupon to conſult me, and I, having examin'd him, and ask'd him ſome Queſtions about Times paſt, found that this Tumour was a Venereal *Exoſtoſis*, which I encountring with Mercurial Frictions, procured him a good condition'd Flux, and cured him perfectly.

There are two Things to be remark'd in the Error of theſe Gentlemen; the firſt is their having taken this Swelling for a deform'd *Callus*, and the ſecond the adviſing the Patient to break this ſuppoſed *Callus*, to ſet the Bones again better.

As to the firſt, I ſay that this Diſeaſe cou'd not reaſonably be taken for a Deformity of the *Callus*, becauſe the *Clavicle* had not been broken, which is proved by three Reaſons; firſt, becauſe the Patient did not complain at the Time of his Fall, of Pains in his *Clavicle*, and 'tis known he would have felt very ſharp ones if that Bone had been broken.

Secondly, altho' the *Callus* had been form'd, the Arm would have been found in an unnatural Poſition, as it always is when the *Clavicle* is broken; that is to ſay, it would have been unſteady, and without Force, reſting upon the Fore-part of the Breaſt, becauſe this Fracture never happens without the Bone's being diſplaced, as has been ſaid.

The 3d Reaſon wherefore they were in the wrong to take this Tumour for a deform'd *Callus*, even if there had been a Fracture, is, that the Reduction not having been made, the *Callus*, inſtead of being found at the middle of the *Clavicle*, as was this Patient's Tumour,

muſt have been near the *Acromion*, as I have ſince ſeen it in an Officer of her ſerene Highneſs the Dutcheſs of *Brunſwick*. This Officer had his *Clavicle* broken in *Provence*, and not having found any one there that could reduce it, the Pieces had re-united of themſelves one upon the other, ſo that the End that is joined to the *Sternum* went over the End that joins to the *Acromion*: And as, at that Time, the Arm, and conſequently the *Omoplata* draws always near the Breaſt, the End of the *Clavicle* that is joined to the *Acromion* was come nigh the *Sternum*, and that which is joined to the *Sternum*, near the *Omoplata*; ſo that the nutritive Juice which had flow'd from the latter, had form'd a *Callus* an Inch from the *Acromion*, a Place where the *Callus* had not been form'd if the *Clavicle* had been reduced.

How then can any one adviſe the breaking the *Clavicle* again when there is a Deformity in the *Callus*, ſince the *Callus* of the *Clavicle* is generally deform'd, however well it may have been reduced? The Reaſon is becauſe the Dreſſing can't compreſs the nutritive Juice near enough; beſides, one may give this Advice, when the Deformity proceeds from the Bones being got one upon the other. This may be diſcovered by two Things; firſt, when the *Callus* is near the *Acromion*, as has been ſaid; and ſecondly, when by meaſuring the *Clavicles*, that which is hurt proves ſhorter than the ſound one; but when both are of the ſame length, one muſt be very ignorant to be deceived therein. I concluded that the Swelling of the Patient beforementioned was an *Exoſtoſis* from three indiſputable Points; firſt, becauſe the Length of the *Clavicle* was the ſame as before. Secondly, it had not been reduced; and thirdly, he had

had

had venereal Distempers, whereof he had never been well cured.

CHAP. IX.

Of the Fracture of the Omoplata.

THE *Omoplata* may be broken either in its Body, or its Appendages: Its Body may be broken but in two Pieces at the most, its *Epiphyses*, as the *Apophyses Acromion*, the *Coracoides*, the *Spine*, and its Neck may be fractured also. I have never seen the *Apophysis Coracoides* broken, but by Gun-Shot.

The Body of the *Omoplata* may be broken long-ways cross-ways, or obliquely; when it is broken long-ways, the *Spiny Apophysis* is broken a-cross, and then there can hardly be any great displacing, because the Surface of the fractured *Spine* is considerable, which makes it difficult for the Bones to get one upon t'other: On the contrary, when it is broken across or obliquely, the fractured Pieces are so thin, and consequently the Surfaces whereby they are join'd, that the least Contraction of the Muscles force one Piece over the other, let the Blow have separated them never so little, or the Muscles of one Side have got the better of those on the other. For this Reason I have almost always seen the hind Part under the Fore-part, on Account of the *Serratus Major* and *Sub-Scapularis*, which being fixed to the *Basis* make it turn topsy-turvy; then the *Infra Spinatus*, *Rotundus Major* and *Minor* draw it under the Fore-Part, more or less. Kinds.

The Signs, whereby this Fracture is known, are the ſame with thoſe we have given of all Fractures in general, and beſides there is generally an *Emphyſema.*

I have already obſerved the *Emphyſema* to be a Symptom that attends Fractures, and even great Contuſions on the Region of the Breaſt. I have not explained it, which methinks I ought to have done: And there are a great many who perhaps will not be able to imagine how the *Emphyſema*, which is a windy Diſtemper, can come where there is no Wound, thro' which the Air might get in: The *Emphyſema* has been ſeen in Wounds in the Breaſt, and in thoſe of the *Aſpera Arteria*, and it has been eaſily comprehended that the Air that iſſues out, or enters in at theſe Openings, may lodge in the *Sacculi Adipoſi* that are adjacent; but 'twill be asked whence comes the Air that forms the *Emphyſema*, which, (as I have ſaid) accompanies the Fractures and Contuſions of the Ribs, and thoſe I have obſerved in Fractures of the *Omoplata*, where there is no Wound: The ſubſequent Obſervations will anſwer this Queſtion.

1ſt. Obſervation, the Wounds that penetrate the Breaſt, or that pierce the *Trachea*, are not the only ones that are attended with an *Emphyſema*; this Symptom happens alſo in thoſe that do not penetrate; we have ſeen ſeveral of this Kind, and likewiſe many that did penetrate where there has been no *Emphyſema.*

2d Obſervation, the *Emphyſema* often accompanies Wounds in the *Abdomen*, whether they penetrate or not; I have often known it in Wounds in the Arm and Thighs, and they who have ſeen a great many Wounds by Gunſhot, know that there are few but what have

this

this Symptom, if they have been never ſo little expoſed to the Air before their firſt Dreſſings are put on.

3d Obſervation, a Cobler returning from *Vauxgirard* to *Paris*, was ſo cudgell'd, that he was bruiſed to the very Bone in ſeveral Parts of his Body; all the Places that had been ſtruck made a Noiſe, and almoſt his whole Body became one *Emphyſema*: He died, I opened him and was very much ſurprized at finding Air every where, the Knife cut no one fat Part but it made a Noiſe; and what I remarked, which was very particular, was, that almoſt all the Muſcles had loſt their natural Conſiſtence, and made no Manner of Reſiſtance to any Thing, whether one drew them long-ways or a-croſs, they were equally eaſy to be ſeparated.

4th Obſervation; there are Impoſthumes open'd every Day, out of which, jointly with the *Pus*, there iſſues Air that makes a Noiſe, as if it came from a Bladder blown up; one may even ſee Part of the *Pus* frothy or in a Foam.

5th Obſervation, are not Gangrenes, that come after *Eryſipelatous* or *Phlegmonous* Defluxions, attended with an *Emphyſema?*

From all theſe Obſervations a Man may conclude, that there are two Sorts of *Emphyſemas*; one whereof is cauſed by the external Air that iſſues out of the Wounds of the Lungs, Breaſt, or *Trachea*, which is that mentioned in the firſt Obſervation.

The other Sort muſt proceed from the Rarefaction of the Air that is found in the Juices and the Subſtance of the Parts, which is that of the three laſt Obſervations; and indeed, when there is no Wound, one can't believe

Conclusion of the Observation.

that the external Air has enter'd to form these *Emphysemas*; nor that the Air of the Breast and Lungs has got thither, at least not by sensible Openings, since there is no hurt in the Lungs nor Breast: It proceeds then from the Fermentation of the diffus'd Juices, which disuniting the essential Parts of the Liquids, breaks the Prisons of the Particles of Air, which, being no longer confined, dilate themselves, rarefy, and uniting together, form an *Emphysema*.

Prognostick.

If the Fracture of the *Omoplata* is simple, and without any considerable Contusion, it is not fatal; on the contrary, if it is attended with a violent Contusion, a Tumour, *Emphysema*, Fever, Pain, and Difficulty of Breathing will follow, and there is great Danger, especially if the Patient be fat, *Cacochymick*, or *Plethorick*.

Cure.

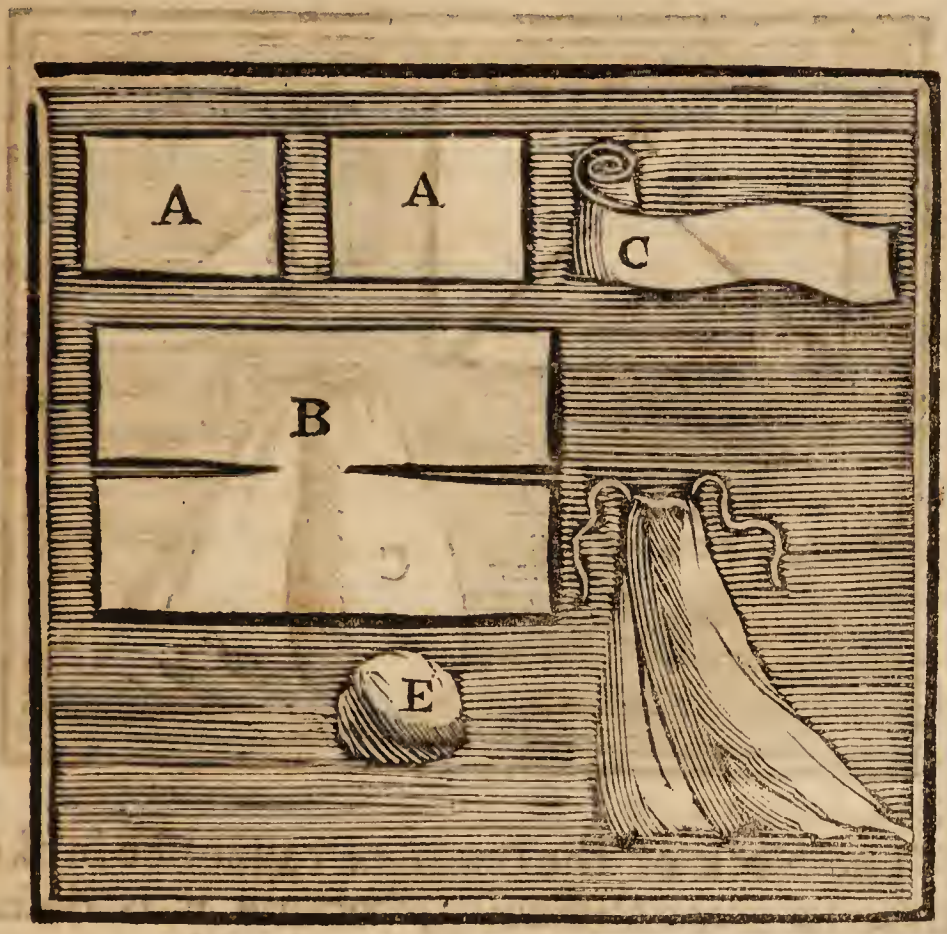
The Reduction is pretty difficult to be made, when the Bones are displaced, and the Pieces are got one upon the other; because the *Omoplata* is cover'd with strong Muscles, and one cannot get the better of them by the Extensions, for want of having Hold of the Pieces, that must be brought even with each other. However,

Manual Operation.

'tis for this End that they raise the Arm forwards, putting the Hand upon the Head, so that the Nose is over against the Angle of the bending of the Elbow. Whilst an Assistant keeps the Arm in this Position, the Surgeon does his utmost to replace the Bones with his Fingers, to the doing whereof the Muscle

Rhom-

Rhomboides contributes very much, becauſe it retains the hinder Piece near the Spine, whilſt the Surgeon brings the Bones together. When they are reduced, one muſt keep them right with both Hands, cauſing the Arm to be let down ſoftly, and following the *Omoplata* till it be above the hinder Part of the Ribs, which ſerve as a faſtening to it on that Side. To faſten it on the outſide, they fix the thick Compreſſes (AA) from the Spine of the *Omoplata* to underneath the lower Angle, which muſt reach down towards the Back-Bone, and they cover them, and the whole Shoulder with the large Compreſs (B.) Then the Bandage *Quadriga* muſt be made with the Roller (C) four Fingers broad, and five or ſix Ells long, more or leſs, and the Arm muſt be placed in the Scarf (F) with the Pellet (E) in the Hand. Dreſſing.



General Remedies.

The Patient must bleed plentifully, his Regimen should be strict, and he must keep silent and quiet, as in the Fractures of the Ribs and *Sternum*.

First Way to raise the Bone.

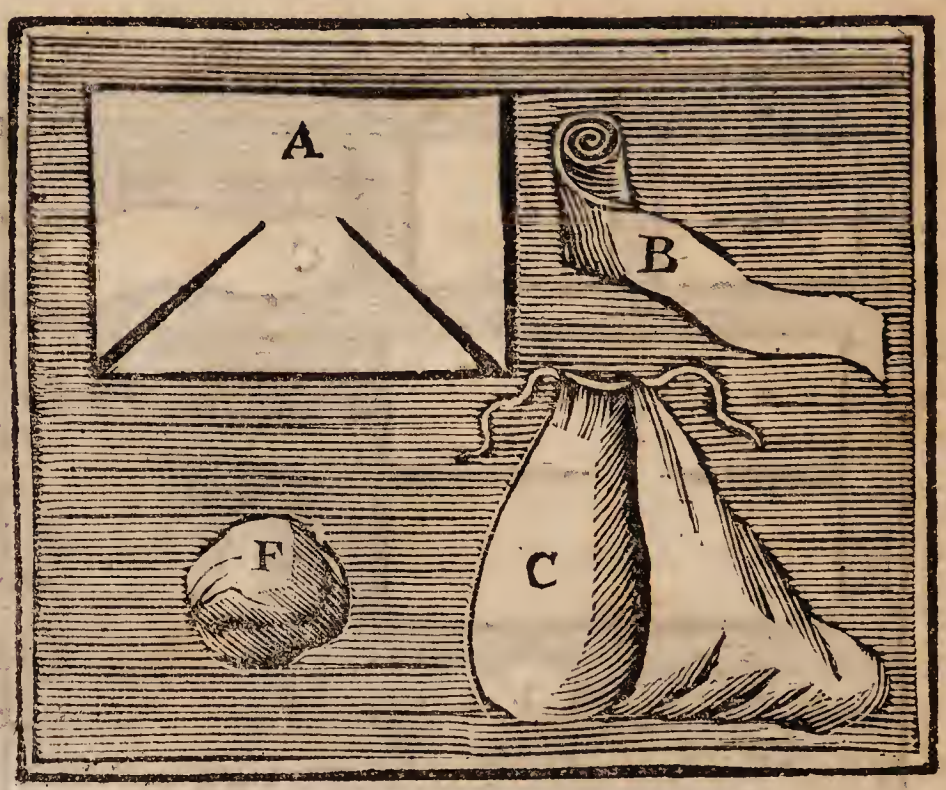
If the *Acromion* be fractur'd, they endeavour to raise it one of these two Ways. The first is by raising the Arm to relax the *Deltoides* and putting the Ends of the Fingers as far as one can under the *Acromion* and the *Clavicle*, to draw them upwards.

Second Way.

The second Way is to take hold of the Elbow to thrust the *Humerus* upwards vertically, and to make Use of the Head of the Bone to thrust the *Acromion* upwards and raise it.

Dressing.

They put on the Compress (A) steept, and make only a contentive Bandage with the Band (B) then they use the Scarf (C) with the Pellet (F.)



Observation.

The Neck of the *Omoplata* cannot be broken but with great Difficulty, because it is defended by a great many Muscles, by the *Acromion*, the *Clavicle*, and the Head of the *Humerus*; never-

nevertheleſs I have ſeen it broken near the Edge of the Socket. It was eaſily reduced, but very hard to contain, and the Patient continued lame.

Obſervation.

I was one Day at a Conſultation for a Lady who had fallen about ſix Weeks before, and a great many fruitleſs Attempts had been made to reduce her Arm, which we found diſlocated. The Conſultation was famous, all Sorts of Miniſters of Health were there, and even the Bone-Setter who had the Patient under Cure, who affirmed that the Bone was well ſet, and that if ſhe did not uſe her Arm, 'twas becauſe the Socket of the *Omoplata* had been broken, and that therefore there was both a Luxation and Fracture. Thoſe who were experienced in the Art were not ſatisfied with theſe Words, they would have Proofs, and they deſired no other of him but to tell the Signs whereby he had diſcover'd that there was a Fracture of the Neck of the *Omoplata*: He could not give us any, which would have been very eaſy for him to do, ſince the Queſtion was about a Thing of ſix Weeks ſtanding, whereof he had been the only Witneſs. Upon this only, his having no Proofs, we might conclude that his Allegation was falſe; beſides, he had ſaid nothing in ſix Weeks, and 'tis known that thoſe Gentlemen don't uſually make Diſtempers leſs dangerous than they are. He thought to creep out at this Loop-Hole, but he did not know the Way; the Reduction was made in his Preſence, and he ſaid not a Word, which was wonder'd at.

'Twas

'Twas then demanded whether the Fracture of the *Humerus*, and the Fracture of the Sides of the Cavity of the *Omoplata*, cou'd happen together. All the Persons of good Sense, and expert Practitioners agreed, that it was morally impossible for Reasons founded upon the Structure of the Parts, and the Laws of Motion.

The Structure of the Articulation shews that the Thing is impossible: First, because the Sides of the Cavity is much harder than the Head of the *Humerus*; and therefore in striking against each other, the latter would be broken sooner than the former.

Secondly, The Head has a great deal more Surface than the Cavity, therefore when a Body which has much Surface, strikes against a Body harder than it self, the hardest Body must resist, and the softest must be broken in Pieces. It may be objected to me, that a Candle being shot from a Gun will pierce a Deal Board, whose Body is much harder than it self: 'Tis true, but if this Candle did not come Endways, where it has least Surface, this would never happen, whatever Force were given it.

The 3d Reason why the Head of the *Humerus* cannot break the Side of the Cavity is, that it is not shot from a Distance like a Candle; on the contrary, it immediately touches the Cavity.

The 4th is, That the *Omoplata* is a Bone whereupon the Head of the Bone does not bear in a Line of Gravity; and besides, it has no Bone that serves it as a Stay, to make it able to resist; on the contrary it gives Way, and all the Motion that the Head of the Bone imparts to it is deaden'd and lost in the Flesh,

and

and other ſoft Bodies wherewith it is incompaſſed.

5. Let us ſuppoſe that 30 Degrees of Motion are ſufficient to luxate the Arm, what muſt happen when in a Fall theſe 30 Degrees are communicated to the Head of the *Humerus?* I anſwer that the Determination of the Motion muſt decide it; if the Head be determined by a Line that does not tend to the Cavity, it will be forced out, and the Remainder of its Motion will be imparted to the Parts adjacent; if it is thruſt by a Line that falls upon an excentrick Point, the Head may be beaten back a little, and if its firſt Determination be not deſtroyed it may again diſlocate; and if the Head moves upon a Line that terminates in the Center of the Cavity, it will not come out in that Caſe, and if the Motion be ſtrong enough to cauſe a Fracture, it will be the Head, and not the Socket, which will be broken.

From this laſt Reaſon it may be concluded, that if the Bone luxates, neither the Head nor the Cavity are in Danger, and that if it does not luxate, the Head ſuffers all, and the Socket reſiſts.

I have known this Caſe happen, a Man fell upon his Shoulder, having been juſt run three or four Times through with a Sword; I was call'd, he complain'd more of his left Shoulder whereon he fell, than of his other Wounds, whereof he died 24 Hours after. I opened him, to give an Account of it; I examined the Articulation of the Shoulder, wherein I found that the Head of the *Humerus* broke into ſeveral Pieces, and the Cavity *Glenoides* was entire. There was no Luxation, the Arm was only diſplaced by Reaſon of the Fracture.

CHAP.

CHAP. X.

Of the Fracture of the Arm.

IT muſt be obſerved in the Fracture of this Bone, that it ſuffers leſs diſplacing length-ways than otherwiſe, on Account of the Weight of the Limb, which oppoſes the Contraction of the Muſcles, that uſually cauſe the Diſplacing. But for all this Weight, there would nevertheleſs be a diſplacing length-ways, if the Bone were fractured in its upper Part above the Inſertion of the Muſcle *Deltoides*; becauſe the Force of this powerful Muſcle, aſſiſted by the *Biceps*, and the long *Extenſor* of the Fore-Arm might get the better of this Weight. The diſplacing being little, there needs but a ſlight Extenſion to reduce it.

Operation.

In performing this Operation, an Aſſiſtant holding the Arm with both his Hands, the one upon the Fore-Arm near the Wriſt, and the other near the jointing of the Elbow, muſt raiſe it up gently and by Degrees, whilſt the Surgeon, ſuſtaining the two fractur'd Ends, raiſes them with the ſame Softneſs as his Aſſiſtant, till the Arm almoſt makes a right Angle with the Body.

Things being order'd thus, the Extenſions muſt be made by two other Aſſiſtants; one whereof muſt take hold of the Head of the *Humerus*, and the End of the *Omoplata* with both Hands, and the other muſt graſp the *Humerus* near the Articulation of the Elbow. The latter drawing makes the Extenſion, and the other reſiſting, or even drawing, makes

the

the Counter-Extenſion. The Surgeon being attentive to what paſſes, muſt endeavour to adapt the Ends of the broken Bones; but he muſt not begin this Operation till he judges the Extenſions ſufficient, and he muſt obſerve all that we have ſaid, in our general Account, on this Subject.

One muſt uſe a Scarf, which ſhould be as ſhort as poſſible when this Bone is fractur'd croſs-ways; but when 'tis broken obliquely, it muſt be ty'd looſe, that the Arm may hang down, and the Weight of it may withſtand the eaſy mounting of the Bones one upon the other: The Arm muſt be hinder'd from moving towards the Ribs, becauſe that Motion wou'd cauſe a ſecond Diſplacing. When the Fracture is in the upper Part, a roll'd Band muſt not be uſed, becauſe the Roll of it can't eaſily paſs under the Arm-Pit, which would oblige one to make ſome Motion outwards that would be very hurtful; for this Reaſon in theſe Caſes they uſe a Bandage with eighteen Tails.

Remark upon the Dreſſing.

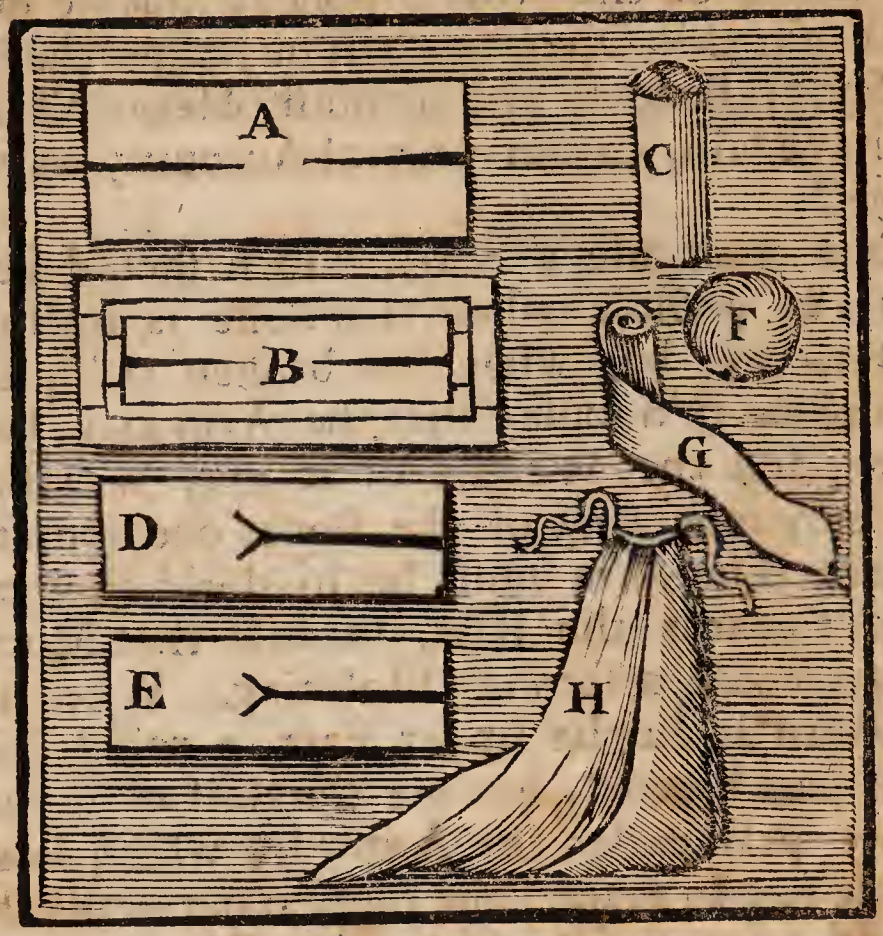
The Signs, the Prognoſticks and putting on of the Dreſſing are as in the Fractures of other Limbs. See that of the Thigh, or of the Leg. The Dreſſings muſt be cut out after one of the Manners here engrav'd.

Firſt Plate.

Apply the ſimple Compreſs (A) for a Fracture of the Neck, or near the Neck of the *Humerus*; and make uſe of the Bandage with ſeveral Tails (B) of the Compreſs made like a Cylinder (C) under the Arm-pit, of the two Compreſſes (DE) to wrap round the reſt of the Arm and the Fore-Arm, of the Pellet (F)

to

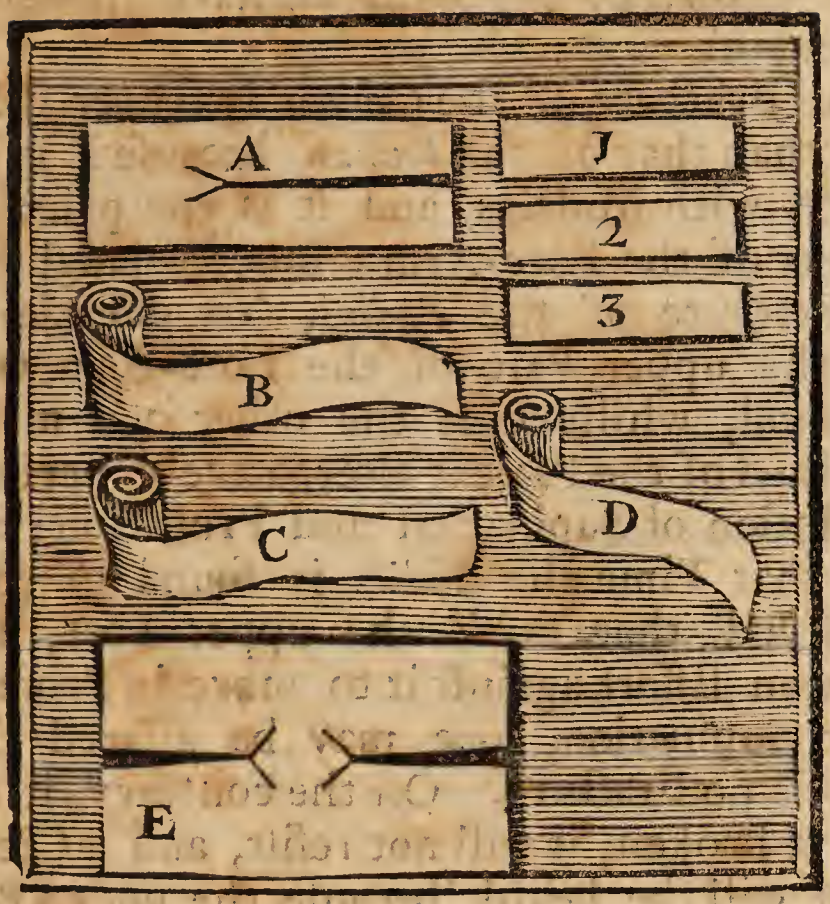
to put in the Hand, of the Roller (G) to surround the Whole, and laſtly of the Scarf (H.)



Second Print.

If the Fracture is in the under Part, they uſe the ſimple Compreſs (A) the Band (B) then another Band (C,) after this the 3 longitudinal Bolſters 1. 2. 3. they are made faſt with the Roller (D,) the Fore-Arm being cover'd with the Compreſs (E,) and the Pellet and Scarf put on as beforemention'd.

CHAP.



CHAP. XI.

Of the Fracture of the Fore-Arm.

Structure

THE Fore-Arm has two Bones, the *Cubitus* and the *Radius*, which are jointed above with the *Humerus* and below with the Wriſt, leaving between them a Space that proceeds from the bending of theſe two Bones; the one a little inwards, the other outwards. They are both join'd at their two Extremities; and the Space that is left in the Middle is wholly fill'd up the whole Length of it by a ſtrong, but ſmall Ligament, that adheres both to the one and the other.

Kinds.

They may be broken either both together, or ſeparately: The Fracture of both may be eaſily

easily known by the Signs we have spoken of in General.

Signs. The Fracture of the *Cubitus* is sooner discover'd than that of the *Radius*, because it is less cover'd with Muscles, and it is the principal Support of the Fore-Arm: But in judging of the Fracture of the *Radius*, 'tis essential to hold the upper Part of the Fore-Arm with one Hand, whilst with the other one makes the Hand of the Patient alternatively perform the Motion of Supination and Pronation; and if at that Time the *Radius* is found to resist the Hand that holds the upper Part, and makes an Effort against it to move in Pronation or Supination, one may be assured that there is no Fracture. On the contrary, if the Bone is broken, it will not resist, and a Crepitation will be heard, because the under Part of the *Radius* in moving, will rub against the upper Part, which is kept, as it were, immoveable by the Hand that holds the upper Part of the Fore-Arm. This would not happen frequently, if one were only to move the Patient's Hand in Pronation or Supination, without holding the upper Part; for it might very well follow the under one, altho' the Bone were broken, which must not be; for there must absolutely be but one Piece in Motion, to the End that the Crepitation may be felt, or else both of them must move contrary Ways.

How the Crepitation is discover'd.

Remark.

The Ends of the broken Bones may be displaced two Ways, either in length, by getting one upon the other, or else in thickness only, which both together are of greater thickness than the one was when whole.

As to the displacing length-ways, I know it may be disputed me in Fractures of one

Bone

Bone only: But I ſhall prove it hereafter ſo as to leave no Room to doubt it.

I paſs on to the Diſplacing in Thickneſs which may happen two ways. The firſt, is when the Bones are not entirely ſeparated in Thickneſs, that is to ſay, that their broken Ends ſtill touch a little: The ſecond, is when they are brought near the *Cubitus*, which happens becauſe the *Rotundus* and the *Quadratus*, two Muſcles that help the Pronation, work together, and draw theſe Pieces of the Bone towards the *Cubitus*.

The Peices of the Radius are brought near the Cubitus.

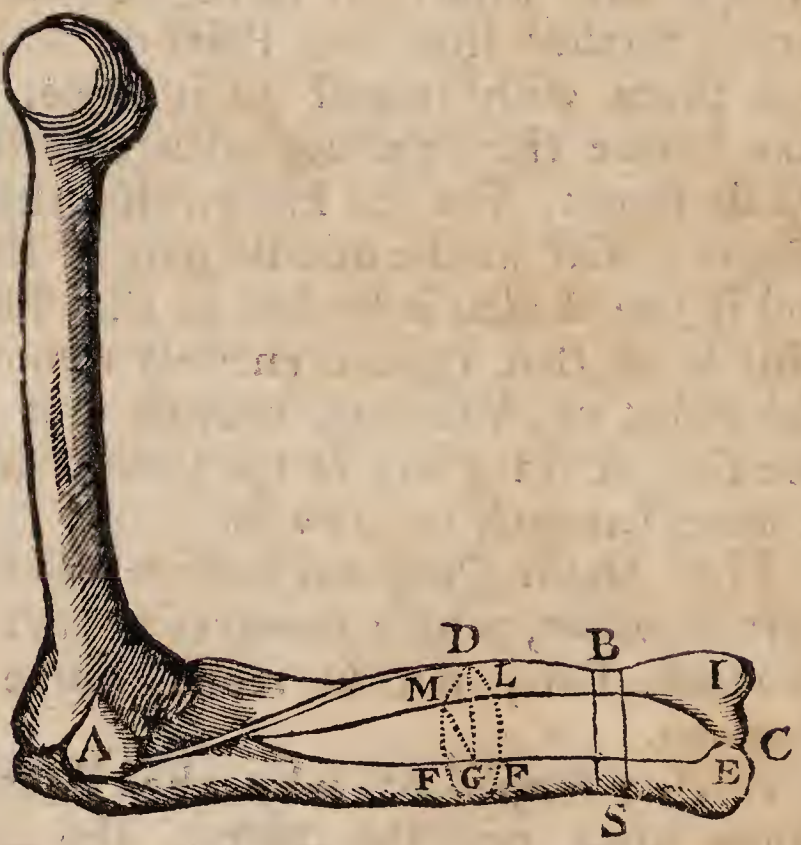
It muſt be obſerv'd, that theſe Muſcles, in drawing the fractur'd Bones towards the *Cubitus*, draw them a little inwards, that is to ſay, on the Pronation ſide; which the round Muſcle does with moſt force, becauſe it is inſerted farther from the Point of Adheſion of this Piece with reſpect to it alone, than it was before the Fracture with reſpect to the whole Bone: For 'tis known that this Muſcle inſerts it ſelf at the middle part of the *Radius*, and if the *Radius* is broken at that Place, the Muſcle at that Time is entirely remov'd from the Point of Adheſion, becauſe it is quite at the End of this Piece of the Bone, which gives it more ſtrength to draw it.

The *Muſcle Quadratus* carries alſo the lower Part inwards, which however it can't do with ſo much Eaſe, nor ſo much Force as the *Rotundus*.

Having explain'd why the Ends of the Bones draw near the *Cubitus*, the Diſplacing length-ways muſt be prov'd, for the Adheſion of this Bone with the *Cubitus* withſtands this Diſplacing. Nevertheleſs, to prove it, one need only remark that the two Ends of the Bone cannot incline towards the *Cubitus*,

without approaching one another, and that if their Ends don't meet, they can't draw near the *Cubitus*: But if they are diſplaced in Thickneſs, and the Ends don't meet, then they will be brought near the *Cubitus*, which they can't do without mounting a little upon one another, becauſe the *Radius* is a little crook'd. You need only look upon this Figure, where I ſuppoſe the *Radius* fractur'd at the Point (D) I ſay, firſt that the End (M) of the upper Part of the *Radius* will be carry'd by the Influence of the round Muſcle (AD) towards the *Cubitus*, not by the right Line (DG) but by the crooked Line (DF).

Diſplacing length ways.



I ſay,

I ſay, ſecondly, that the lower Part of the *Radius* mark'd (L) will be brought near the *Cubitus* by the Action of the ſquare Muſcle (BS) not by the right Line (DG) but by the crooked Line (DE) ſo that the End (L) of the *Radius* being got to (E) will be mounted upon the End (M) of the *Radius* that is got to (F) by the whole Quantity of (EF).

Obſerve that not one of theſe diſplacings wou'd happen, if at the End of the fractur'd Bones there ſhou'd be any little inequalities, ſharp Ends or Splinters; becauſe they wou'd lock themſelves one in the other, and oppoſe the diſplacing; thus there are Fractures found where there is but little diſplacing, and conſequently little Extenſion ſuffices to reduce them. Remark.

But where there is a diſplacing, Extenſion and Counter-Extenſion muſt always be made: If the Ends of the *Radius* are near the *Cubitus*, the Surgeon muſt bow down the Hand on the ſide of the *Cubitus*, that he may raiſe the lower End of the *Radius*, ſo that by this means he will make the Extenſion and Counter-Extenſion, neceſſary to mend the diſplacing lengthways; and he muſt preſs with one Hand the Fore-Part of the Fore-Arm againſt the Hind-Part, and with the other the Hind-Part againſt the Fore-Part; to the End that the Muſcles that are before, being thus thruſt againſt thoſe that are behind, may be oblig'd to lodge themſelves between the *Radius* and the *Cubitus* which they can't do without raiſing the Pieces of the broken Bone. Manual Operation.

The ſecond thing done by this ſame Preſſion of the Surgeon's two Hands is, that it helps the diſplacing in thickneſs, by making what we have call'd the Conformation. There

needs no precaution to prevent the Bones ſeparating from each other, becauſe they are retain'd by the inter-oſſal Ligament.

When they are reduced, ſome lay Splints upon the Ends of the broken Bones, which ought carefully to be avoided, for, far from bearing upon the fractur'd Ends, the Bands, Compreſſes, and Splints muſt be ſo placed as to produce almoſt the ſame Effect as the Hands of the Surgeon in reducing the Bones: That is to ſay, that after having put on a ſimple Compreſs, and the firſt Band ſlightly faſten'd, two thick Compreſſes muſt be laid on, one upon the internal and the other upon the external Part, which being both held on, and preſs'd by the ſame Band, thruſt and make an effort againſt each other, by oppoſing themſelves againſt the diſplacing of the Bones either in length or thickneſs, and by this means they will eaſily contain the broken Pieces, becauſe they thruſt the Muſcles into the ſpace that is between the Bones, which keeps the Pieces always rais'd; beſides the Effort even of the Muſcles in contracting themſelves will act in Favour of the Bones, by the Reſiſtance of the Compreſſes that oppoſe their external ſwellings, for which Reaſon the Compreſſes muſt act upon the middle.

Dreſſing.

Over this ſecond Band they put a third, or they uſe the reſt of the ſecond, if 'tis long enough to make ſome Circumvolutions round the Hand, both to keep it without Motion, and to faſten a Pellet that keeps the Fingers half bent. Then they put on two Paſtboards cut ſuitable to the Part, and afterwards they place the Hand and Fore-Arm in a Scarf; the Fore-Arm and the Hand being

being in a commodious and natural Situation, ſo that the Muſcles be not conſtrain'd.

As to the *Cubitus*, 'tis obſerv'd that the upper Piece is always in its place, whilſt the under one is brought near the *Radius* by the means of the Square Muſcle, provided there is no ſharp End or Splinter of a Bone that with-holds it. Of the Cubitus.

Some there are who believe that the *Cubitus*, when fractur'd, throws it ſelf outwards, but Experience ſhews the contrary; in compli- cated Fractures it has always been remark'd that the upper Part of the *Cubitus* is in its Place, and that the lower End is brought near the *Radius*. Beſides 'tis demonſtrated that neither of theſe Bones, nor of their broken Pieces can be diſplaced by removing from each other, becauſe the inter-oſſeous Ligament always retains them. Obſervation.

The upper Part can't come near, becauſe there are no Muſcles that can draw it inwards, and 'tis impoſſible it ſhou'd throw it ſelf outwards by ſeparating from the *Radius*, becauſe the inter-oſſeous Ligament withſtands this ſeparation.

It is not the ſame with the lower Extremity of the *Cubitus*, which may be brought near the *Radius* by the influence of the Square Muſcle; for altho' this Muſcle be deſign'd for the moving of the *Radius*, it produces a quite contrary Effect on this Occaſion; for when this Piece of the *Cubitus* to which the *Quadratus* is faſten'd, breaks, and is ſeparated from the upper one; it neceſſarily follows that it can no longer be the fix'd point of the *Quadratus*, and that therefore this Muſcle draws this Piece towards the *Radius*, rather than the *Radius* towards the Piece, becauſe the *Radius*

has two Points that ſupport it, one at the Arm, and the other at the Wriſt; and the lower Piece of the *Cubitus* has no longer any but that below.

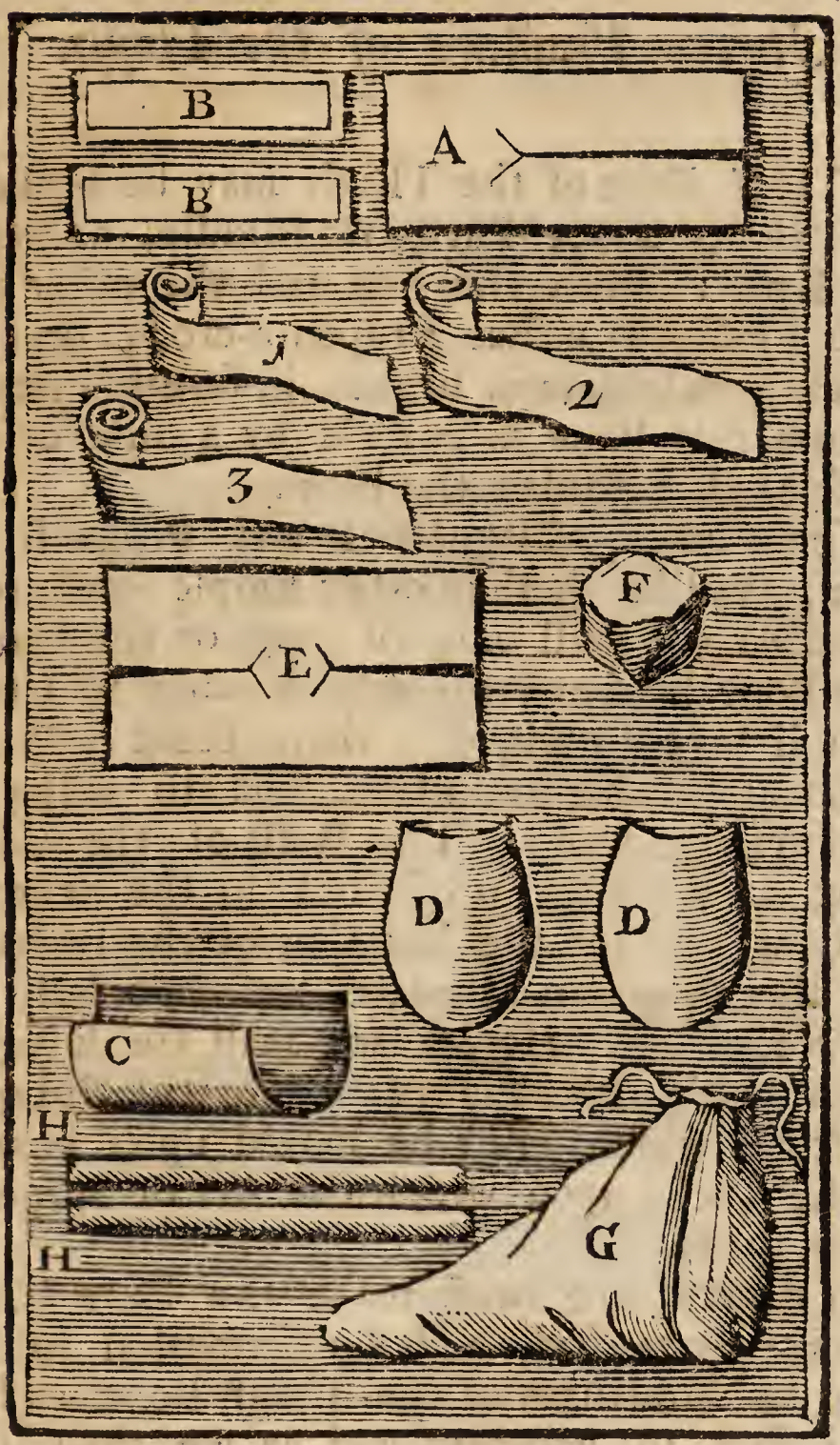
As to the Reduction it is the ſame with that of the *Radius* with this Difference that the Hand muſt be turn'd towards the Thumbs to make the Extenſion, whilſt one preſſes the fractur'd Part with both Hands.

The Bandage muſt be made as for the *Radius*, with this Exception, that there is not ſo much care to be taken to make faſt the upper Part of the *Cubitus*, becauſe it can only move in Flection and Extenſion, which muſt be hindred by the Scarf.

When both Bones are fractur'd, one muſt obſerve almoſt the ſame Circumſtances, which muſt be deduced from the ſtructure of the Part, which ought always to be kept in view, not only in this Operation, but in all others.

The Dreſſing conſiſts of a ſimple Compreſs (A) ſplit, of two thick Compreſſes (BB), of three Bands (1) (2) (3) of one large Paſtboard (C) or two little ones (DD), faſten'd with two Straps (HH) of a Compreſs that ſurrounds the Hand (E) of a Pellet (F) to fill it, and of a Scarf (G) to ſupport and incloſe the Hand, the Fore-Arm and the Elbow.

CHAP.


B
B
A
1
2
3
E
F
D
D
C
H
H
G

CHAP. XI.

Of the Fracture of the Thigh.

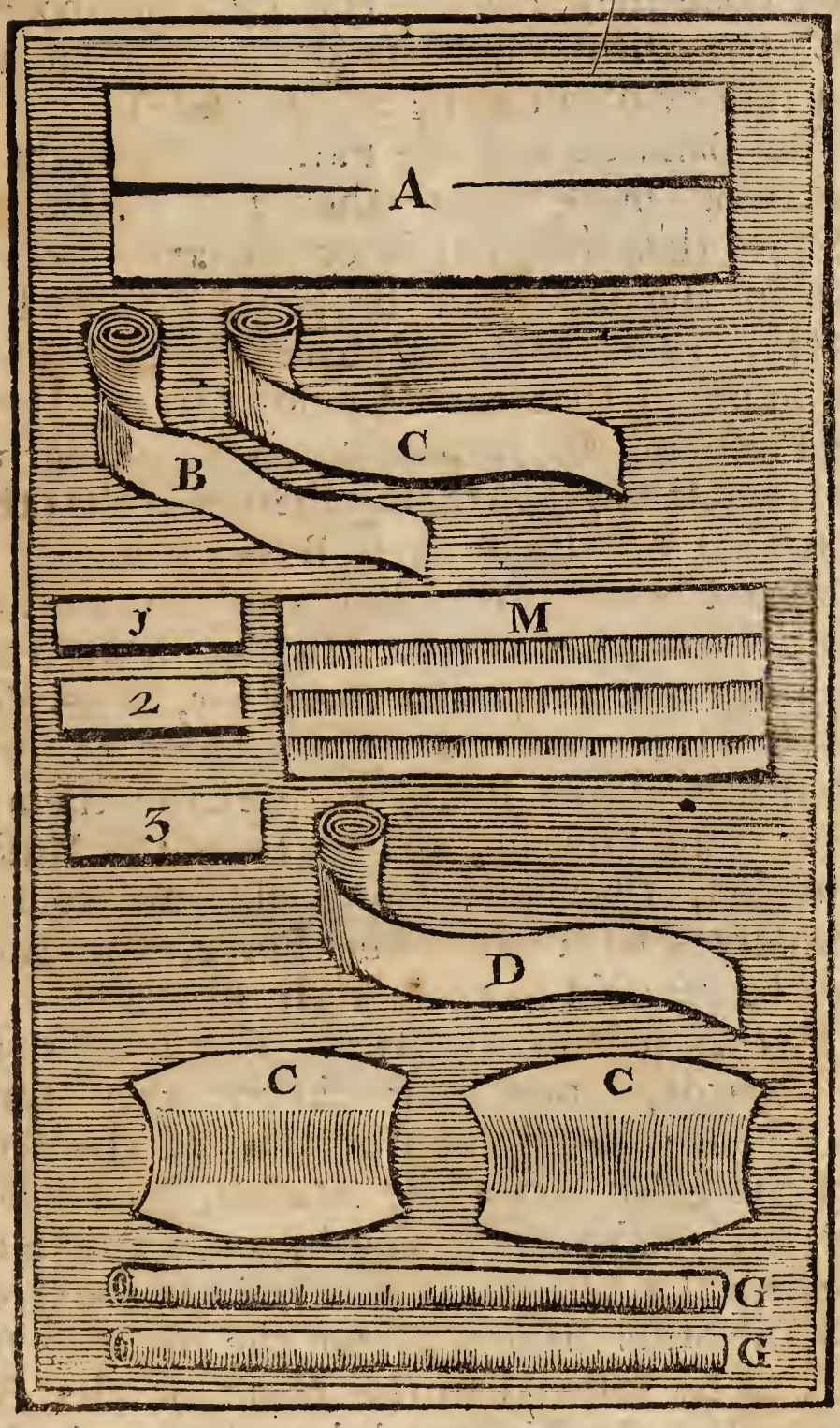
THE Bone of the Thigh may be broken in its upper Part, its Middle, or near the Knee: Both the one and the other of theſe Fractures either happen a-croſs, or obliquely; it ſeldom is broken in ſeveral Pieces, becauſe this Bone is cover'd by a number of Muſcles that deaden the Blow.

The Cauſes, Diagnoſtick and Prognoſtick Signs, are like thoſe in other ſimple Fractures, therefore we ſhall only of treat of the Cure. The Bone broken croſs-wiſe is eaſier to Cure than if 'twere obliquely, there being nothing to do after the Reduction, but to make a common Bandage: The Reſt of the Cure being as we have preſcrib'd in the general Account, except the ſituation of the Patient, and the Ways to alleviate, and eaſe him in his Neceſſities. Hereof we ſhall ſpeak very much at length in the treating of the Oblique Fracture which muſt be look'd upon as one of the Rocks upon which the Art of Surgery often ſplits.

In general one muſt make the Extenſions, Counter-Extenſion, and Conformation to reduce the Fractures of the Thigh-Bone, as has been ſaid in general, and as we ſhall ſay hereafter in the Fracture of the Leg.

The Reduction of the Fracture of the Thigh being made, the Dreſſing muſt be put on, *viz.* The ſimple Compreſs (A) which covers the fractur'd Part. It muſt be ſteep'd in Aromatick

matick Brandy, then three Turns muſt be made over the Fracture with the Band (B) which is employ'd in making Truſſes aſcending upwards towards the Groin, then muſt be put on the Band (C) which alſo makes three turns over the Part, and Ends near the Knee in Truſſes.



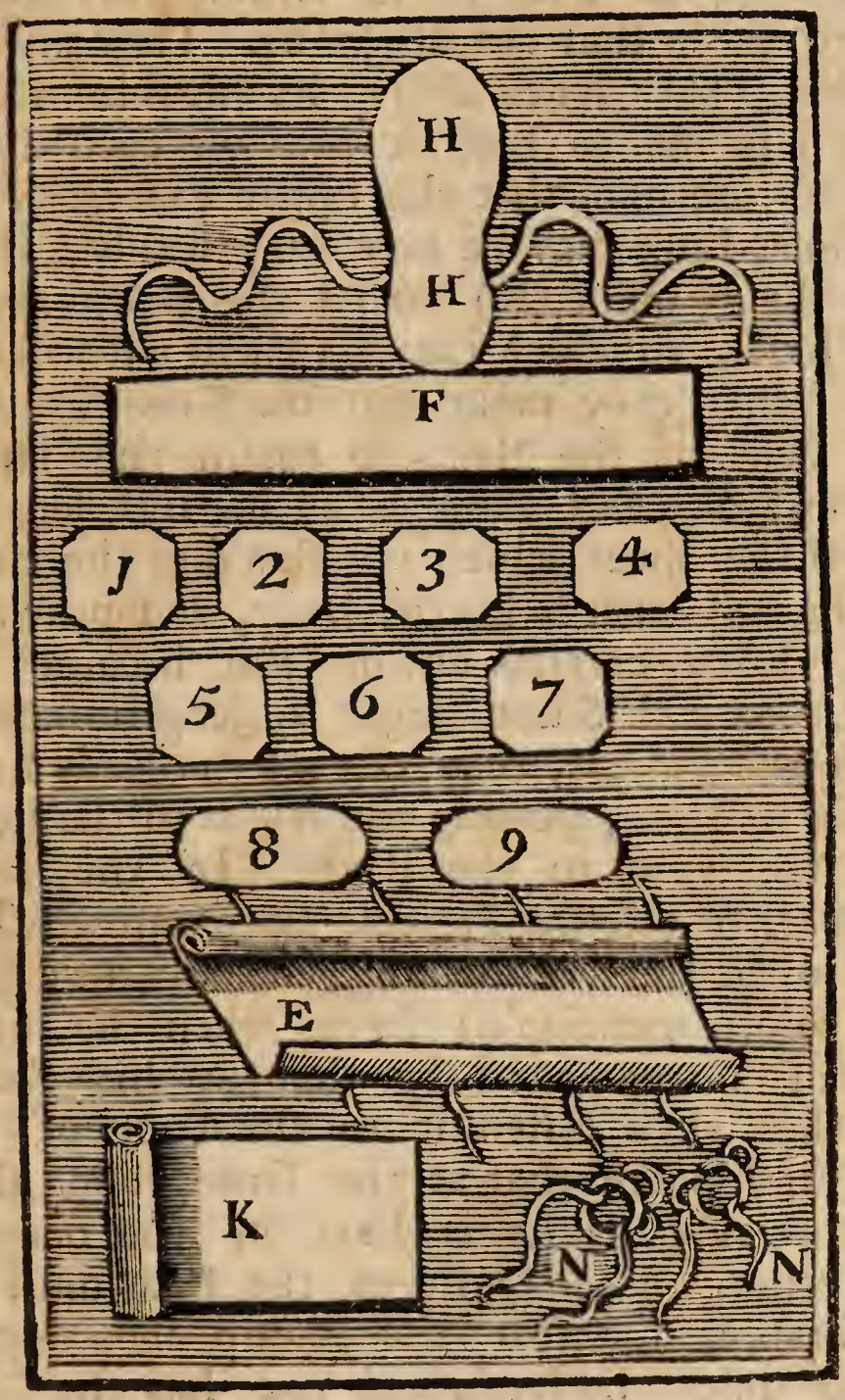
When

When the two Rollers are taken up, the Part muſt be equaliz'd by the graduated Compreſs (M) being thicker on one ſide than on the other; then they place the longitudinal Bolſters, 1, 2, 3. which ſerve as Splints, and they are made faſt with the Band (D) which begins near the Knee, and ends at the Groin. This done they clap on the two Paſt-boards, (CC) one within and the other without and they are ty'd with the Straps (GG).

The Bandage and the Paſt-boards ought be ſomething more light when the Fracture is oblique, than when it is croſs-ways, becauſe that in the latter the broken Bones are ſupported, as it were of themſelves, ſo much the more in that the Muſcles acting, thruſt the Pieces of the broken Bones againſt each other, and ſtrengthen them, whereas in the other, each End of the broken Bones being of an oblique Figure, cannot bear one upon another, and the working of the Muſcles make them ſlip, and get one upon the other, wherefore the Bandage muſt be tighter, both to preſs the Pieces of the Bone, to preſerve them in their right Poſition, and to keep the Muſcles extended, that not being able to contract themſelves with the ſame Force, the Bones may be retain'd in their right ſituation.

Having put on the Bands, Compreſſes, and Paſt-boards, one muſt faſten two Straps (NN) one above the Condyles of the Knee, and the other above the *Malleoli*, and beſides one muſt paſs a great Cloth, or a half Sheet between the Thighs, one end within the Groin, and the other behind under the oppoſite Buttock to be faſten'd to the Head of the Bed, one end on the Right and the other on the Left. This done the Junks (E) muſt be put on, which

which muſt reach the one from the Sole of the Foot to the Groin, and the other from the Sole of the Foot to the *Criſta* of the *Oſſa Ilia*, to the end that they may keep the Foot, the Leg, and the Articulation of the Thigh with the *Ischion* at reſt, ſo that all that can be ſtill, may be ſo.



The

The Junks muſt be trimm'd with little Cuſhions, or the Compreſſes, 1, 2, 3, 4, 5, 6, 7, 8, 9. which are to be put from the Hip to the Foot, to fill up the inequalities; and to the End that the Junks may be ſo well adapted as to make an equal Compreſſion, they put on a long Compreſs (F) which reaches from the Foot to the Groin, over which theStraps go that tye the Junks. They put on a Sole (H) faſten'd by its double Strap, which ſerves to keep it firm on each ſide; and to the end that the upper extremity of the long Junk may be kept very ſteady, they paſs the Napkin (K) round the Body above the Junks, to which they fix them with ſtrong Pins; then they make faſt the Knee-Strap to the Foot of the Bed, to retain the Thigh downwards, and keep it at its full length, whilſt the Sheet which is faſten'd to the Head of the Bed with-holds the Body, and prevents it its being carried down. But becauſe the Cloth or Half-Sheet might at length incommode the Patient, they change the Ends from Time to Time, putting the Right to the Left, and the Left to the Right. In the ſame manner, to eaſe the Patient, the Strap which is ty'd to the ſmall of the Leg (and which we have not before mention'd) ſerves when he finds himſelf incommoded by that at his Knee, for then they faſten it to the Foot of the Bed, and looſen that at the Knee, doing thus alternatively as he is hurt by the one or the other. The Quilt of the Bed muſt be perforated, for fear the Rump ſhou'd gall, which might be fatal, and one has the Convenience of putting a Bed-Pan between the Quilt and the Mattreſs when then Patient wou'd go to Stool, and that he may do it with

with Eaſe, the under Sheet is of two Pieces, which meeting at the Buttocks there is nothing to be done, but to ſeparate them.

At the Foot of the Bed there muſt be a Board fixed, whereunto they nail a Billet, cover'd with a little Quilt, againſt which the Patient may thruſt his ſound Foot to eaſe himſelf, by bearing againſt it to raiſe himſelf from Time to Time, when having ſlip'd downwards, he finds himſelf incommoded by the Half-Sheet that goes between his Thighs; for by thruſting the Sole of his ſound Foot againſt the Billet, he raiſes himſelf better than two Perſons cou'd do it for him. The Board is alſo convenient when the Fracture is a-croſs, becauſe then they neither make uſe of Straps nor a Half-Sheet to withold the Sick Perſon, and it is proper the Feet, even that which is hurt, ſhou'd reſt againſt ſomewhat.

That the Patient may move himſelf with the more Eaſe, a Cord ſhou'd be faſten'd to the Ceiling, and come down thro' the middle of the Bed's Teſter, within reach of his Hand, which is very uſeful.

One muſt examine the Rump very often, for in ſpite of all one's Care it ſometime galls, and a Gangrene follows.

In this Caſe the Vulnerary Water is uſed with good ſucceſs, wherewith they bathe the Part, then they clap on ſome *Storax* ſpread upon a ſoft Paper or fine Linnen, which is all that is particular in this Fracture, the reſt of the Management is to be found in the general Account, wherein we have treated of it very much at length.

SECT.

SECTION II.

Of the Fracture of the Neck of the Femur.

THE Neck of the *Femur* breaks either in its middle near its Head, or near the great *Trochanter.*

When it breaks near the Head, ſome take this Fracture for the coming off of the *Epiphyſis*, and others for a Luxation, nevertheleſs there are ſigns whereby one may diſtinguiſh all theſe Diſeaſes. Theſe three Fractures have often been taken for Diſlocation, There is even an Example in the famous *Ambroſius Paræus*, who was miſtaken therein, and relates his Error with all poſſible ſincerity; a ſincerity very uncommon in the Age we live in, and of which we have hardly any Example ſince *Hippocrates.* No Man need be aſhamed of his Faults but when he has neglected being inſtructed; a ſincere Confeſſion accompany'd with the Circumſtances, is often more uſeful then ſuch Diſcourſes as are dictated by ſelf Love; which ſerve only to render a Book as tedious for its length, as the little worth of the Work. We ſhou'd perhaps have fewer Volumes to read, but more obligations to the Authors, if inſtead of only relating their ſucceſsful Practice they had only treated of their Faults.

I can't therefore forbear blaming the Author of theſe Books ſo ſtuff'd with frivolous Trifles, that they never make amends for the Pains

Pains one has been at in reading them; I blame yet more thoſe, who, far from running this Riſque, neglect the Advantage of reading ſuch as wou'd inſtruct them.

Paræus had never been read by him who, having taken a Fracture of the Neck of the *Femur* for a Luxation, and thinking he had reduced the Bone, contented himſelf with retaining it by a ſimple Bandage. The acute Pains which the Patient felt after this pretended Reduction, made him doubt his Condition, and ſend for me to be aſſured of it; He who had dreſs'd him affirm'd that the Bone of the Thigh had been diſlocated, but I found that the Reduction had never been made becauſe the Thigh that was hurt was ſhorter than the ſound one. The Bandage being undone, I perceiv'd the great *Trochanter* four Fingers breadth higher than it ought to be; the end of the Foot and the Knee were turn'd inwards, which, join'd to what had been told me, made me believe that the Bone was diſlocated; but taking hold of the Foot and turning the End outwards without Reſiſtance, I diſcover'd that there was Fracture at the Neck. I reduced it, and dreſs'd it, following all the Rules I have laid down in the ſimple Fracture of the Thigh, and the Patient was cured without Limping.

Several Reflections that may be uſeful in Practice, may be made upon this Obſervation; the firſt relates to the Signs, whereby one diſcovers the Fracture. It ſeems, by what I have juſt ſaid, as if the eaſy turning the End of the Foot inwards and outwards, were the only Sign by which I found it out; nevertheleſs it is not the only one; but in the Caſe in Queſtion it proved that there was a Fracture, and

that

that it cou'd only be at the Neck of the *Femur*. That this may be comprehended, I ſay that when a Perſon that is hurt lies upon his Back, exactly in a right line from Head to Foot, his Legs and Thighs ſtretch'd out by the ſide of each other, if the *Malleolus internus* of one ſide is higher than that of the other the breadth of three Fingers, and the *Rotula* in proportion, all this lower Extremity will be ſhorter than the other three Fingers breadth, which cannot happen after a Fall, but where there is either a Fracture or Luxation. Then if upon moving the end of the Foot it can be turn'd inwards or outwards with equal Eaſe, I ſay there is no Luxation, becauſe it has been demonſtrated, in the Chapter of the Diſlocation of the Thigh, that, when the Bone is luxated on one ſide, the Muſcles draw the Limb on the other, and that it can't without Pain be carry'd on the ſide contrary to that whither it is drawn by the Muſcles, thus there is no Luxation, and there muſt be a Fracture.

Obſerve than that when the Neck of the *Femur* is broken, the Head of the Bone remains in its Socket, with part of the Neck; the *Femur* no longer having any Eminence to withold it, nothing can hinder its turning at the will of the Hands that move it.

What deceives thoſe who don't examine narrowly, is that in touching the *Femur*, they find it entire its whole length from the *Trochanter* to the *Condyles*; but they will be fully convinced of what I've ſaid, when they make the Extenſions to reduce the *Femur*, which they believe diſlocated; for when by that means they have brought the fractur'd Part of it near that piece of the Neck that keeps

with

with the Head, which is in the Cavity, they will hear the Crepitation, and then the incredulous will be obliged to own that they have miſtaken if they are Honeſt; this is what I had to ſay of the Signs of this Diſtemper.

As to the Cauſe of it, what I have ſeen is this. The *Sieur Colin*, a Maſter Taylor, and an Honeſt Man, having a mind to drop down from a Window ſomewhat high, ſlip'd along the Wall, holding the Ledge of the Window with his Hands; and when he thought he was come as near as he cou'd to the Pavement, that he might fall from a leſs height, he let go his hold, and fell to the Ground upon both his Feet, but unequally, for the right Foot came firſt; thus all the weight of his Body, which receiv'd a conſiderable addition from the ſwiftneſs of the Fall, fell upon the Right Thigh, Leg, and Foot; the Foot, Leg, and Thigh bore the ſhock, becauſe the Line of Direction of the weight of the Body fell perpendicularly upon them, and the Neck of the *Femur* broke, for a contrary reaſon, becauſe of its obliquity.

As to the Cure, it conſiſts in making ſufficient Extenſions, and Counter-Extenſions: And to keep the Bone right, one muſt manage as in the oblique Fracture of the Thigh, to which I refer you.

To finiſh this matter, I muſt ſay a Word about the *Decolement*, or coming off of the *Epiphyſis*; *viz.* 1°. If this Diſeaſe be poſſible, 2°. The Signs whereby to know it, and in the 3d place way to Cure it.

First one must define this Word * *Decolement*, which is equivocal; it may be taken for the separation of the Head from the Neck, in the Sense that one says a Criminal has been beheaded; or else one may understand by this Word, the separation of the *Epiphysis* from the Neck, looking upon the Cartilage that is found between them as a Cement that joins both Parts.

In the first Signification, all the Fractues that are beneath the Head are comprehended, and consequently in the Neck of the *Femur*, which is that above mentioned.

Decolement taken in its second Signification, *viz.* uncementing or coming off, can only happen in subjects where the Cartilage that joins the *Epiphysis* is not yet ossify'd; for in those where the Ossification is perfect, the Neck and the *Epiphysis* make but one, and if it happens that the Head separates 'tis by a Fracture, and not a simple uncementing.

There have been two Persons, within this little while, in this City, who have had a *Decolement*, one whereof consulted me; but my Opinion was, that this was not Separation of the *Epiphysis* from the Neck, because the Patient was 35 Years old, an Age wherein the Ossification is perfect, and the Separation of of the *Epiphysis* is impossible.

That one may not be mistaken in deciding whether the *Decolement* is simple, or caused by

* I make use of the French Word Decolement, because tho' it is equivocal in the French, 'tis not so in the English, ungluing and beheading being vastly different. Nor is it strictly so in the French; for the one ought to be spelt with a double ll, Decollement, and the other with a single one.

by the Fracture of the Neck, one muſt immediately have regard to the Age of the Patient; and beſides obſerve that when the Extenſions are made, as has been ſaid in the Fracture of the Neck of the *Femur*, the Crepitation is hollow, becauſe the Bones only touch a-croſs a Cartilage; whereas 'tis clear and plain when there is a Fracture, becauſe they touch without any Interpoſition. 'Tis true, this Sign is only certain when the Hurt is recent, for when 'tis of long ſtanding, the ſound is hollow even in the Fracture it ſelf, becauſe the Ends of the Bones are cover'd over with the Callous Matter, which has coagulated there, and produced the ſame effect as the Cartilage, in a ſimple uncementing of the *Epiphyſis*.

It muſt alſo be remark'd that the Neck of the *Femur* is much longer in the Simple uncementing of the *Epiphyſis*, than in the Fracture, whence they can't turn the End of the Foot inwards and outwards, with ſo much Eaſe as in the Fracture, and that this Eaſe is greater when the Fracture is at that part of the Neck that is neareſt the *Trochanter*.

After all, of what importance is it to the Cure, to diſtinguiſh the ſimple *Decolement*, or ungluing from the *Decolement* by a Fracture, ſince the Operation is the ſame, and there is no difference in the means of ſupporting the Bones when reduced? We have deſcribed them amply in treating of the Simple and Oblique Fracture of the Thigh, wherefore I ſhall ſay no more.

SECTION III.

Of the complicated Fracture of the Thigh.

ALTHO' Fractures may be complicated in their Causes, as when a Musket-Ball is lodg'd in a Limb, after having broken or splinter'd the Bones, or tho' they may be complicated in their Accidents or Symptoms, as Pain, Convulsions, &c. Nevertheless, when one says, that a Fracture is complicated, Custom has brought it to signify a Fracture with a Wound; 'tis in this Sense that I treat of the complicated Fracture of the Thigh, having sufficiently discoursed of the Causes of Complication in the general Cure of Fractures.

The Wounds which accompany the Fractures of the Thigh-Bone are in general of two Sorts; the one are produced by the Cause it self that broke the Bone, as by a Coach-Wheel, a Musket-Ball, a Splinter of a Bomb or any other; the others are caused by the Bones themselves that are broken, as when they pierce the Muscles, the Fat, and Skin: Both the one and the other are attended with more or less Contusion, have or have not a *Hæmorrhage*, are with or without extraneous Bodies, the Bones are sometimes not uncover'd, sometimes they are, and even issue out thro' the Wound.

The Diagnostick Signs don't at all differ from those whereby other Fractures are discover'd.

Of

Of the Prognostick.

Of all complicated Fractures that of the Thigh is the most troublesome; it is hard to keep the Bones in their place, especially when they are broken obliquely. 1st. The Bone is single, has but little surface in its middle, and besides a great number of very strong Muscles that surround it on all sides, cause the broken Pieces to mount easily one upon t'other. These same Muscles oppose their Reduction, and often displace them, even after they have been well reduced.

2dly, The necessity of moving the Patient for his Occasions, is a great Obstacle to the Reunion of the Bones, which requires a perfect Tranquillity. Remark.

3dly, The Thigh is cover'd with so much Flesh, that 'tis almost impossible to preserve the Incisions in that extent which is proper for leaving the broken Bones bare as long as is necessary, for obtaining Exfoliation. Remark.

The Muscle *Fascialata*, which in all Defluctions causes so many Disorders, is here the source of an infinite number of Imposthumes. Remark.

When the Wound is in the lower Part, this Disease is yet more fatal, in spite of all the ways taken to prevent displacing the Bones in dressing the Wound; and one has often the vexation of seeing Patients die under one's Hands, for whom (if I may use the Expression) one has tired out the Patience, and exhausted all the Remedies in the power of Art.

When this Fracture is so near the Joinings that the Articulation is inflam'd, and Defluctions happen there, 'tis very rare that one succeeds, and the Patients perish by a Fracture near the Joints.

Vomiting and Looseness, a slow Fever, and the Reflux of purulent Matter, which causes Abscesses in the Liver, the Lungs or some other of the Intestines.

When the Fracture is near the upper Articulation, it is still more Dangerous.

Of the Cure.

That Pupils in Surgery may be instructed with the more Ease in this matter, I will take the principal Examples, to which I will add particular Observations that will help to clear up their Doubts; and I will give them a Reason for all that I shall teach them in this Cure, which is apt to perplex the most experienced Surgeons.

For Instance.

Observations. A Man had his Thigh broken by a Kick of a Horse, which had cut part of the *Extensors* of his Leg, without having broke the Skin; I made the Reduction as I have directed in the Article of the simple Fracture, excepting that I did not use a roll'd Band, but a Bandage with 18 Tails, as I mention'd in the same place and elsewhere. Compresses steep'd in Spirit of Wine camphorated, and Aromatick Brandy were of great service, as were plentiful and repeated Bleedings, till the Diminution of the Pain and Tumour made me look upon what remain'd in the Mass of Blood as absolutely necessary for the Life of the Patient; besides this, making him observe a proper *Regimen*, I had the satisfaction of seeing the *Ecchymosis* soften and disperse, and the divided

divided Fleſh and broken Bones grow firm, which was follow'd by a ſucceſsful Cure in two Months time.

Things are not always attended with ſuch good luck; I have often been oblig'd to make an Inciſion to open Contuſions of this ſort, which happen when the Effuſion is conſiderable, when the Subject is Cacochynick, or when the Effuſion is at the very place that is fractur'd, and the Ends of the Bone are ſoak'd in the diffus'd and coagulated Blood. Obſervation.

It muſt alſo be remark'd, that if the Effuſion be of the Blood alone, it does not ſo often Heat, Ferment, or turn into a *Sanies*, as when the *Lympha* is intermingled with it: One generally ſees that it diſperſes in the interval of the Muſcles, and in the *Sacculi Adipoſi*, which forms the *Ecchymarpſis* outwardly of a black Colour, which diſperſes by degrees, by changing from black to a dark Colour, from that to Blue, and from Blue it turns by ſhadows to an Orange, and ſo to a clear Yellow, till at laſt it becomes of the natural Colour of the Skin; then they leave off the Bandage with 18 Tails, and put on a Roller as in ſimple Fractures. If ſuch Effuſions happen over againſt the Fracture, they muſt be open'd if they are conſiderable; Bandages wou'd be uſeleſs, and cou'd not retain the broken Bones, becauſe they cou'd not bind them near enough. Remark. Obſervation.

When one has been oblig'd to open the Tumour, if 'tis not at the place that is fractur'd, the Wound muſt be dreſs'd, as is convenient, making uſe of the Bandage with 18 Tails till the Wound is cloſed, and afterwards of a Roller. Obſervation.

If the Defluction is at the very place that is fractured, and the Bones are bare, they examine whether they are in their right place, and whether there is a Diſpoſition to a Reunion, in which Caſe they don't make uſe of Stopples: Pledgits doubled in two, or any other ſoft Lint is ſufficient. If it ſuppurates well, and not in too great Quantity, and no Accidents happen, the Reunion will be made, the Bones that have not ſuffer'd furniſh without trouble their Contingent for the Formation of the *Callus*, and when the Wound is cloſed, they put on Rollers, if 'tis ſtill neceſſary, to ſupport the Bones. If on the contrary 'tis found that there is any diſplacing, and that the too great, or too irregular Craſh, takes away all hopes of Reunion, then one muſt manage as in the following Example.

Obſervation.

Remark.

Second Example.

A Labourer fell from a Scaffold with a piece of unhewn Stone, which he was holding; he came to the Ground a little ſooner than the Stone, becauſe having quitted hold of it, it was detain'd a Moment upon the ſide of a Plank, from whence it fell upon his Thigh, from above 30 Foot high, and made a very large Wound, thro' which I touch'd the Bones. I advis'd Amputation, becauſe the Craſh was as conſiderable as the Contuſion, and tearing of the Fleſh; and that moreover the Patient had not wherewith to provide all that was neceſſary for ſuch various Dreſſings, and Conveniencies as are requiſite in ſuch a Cure. Nevertheleſs I did all that I cou'd to preſerve his Thigh, hoping he would be aſſiſted and reliev'd in his Wants. I caus'd him to be

put

put into his Bed, (which was firſt equaliz'd) with the Part that was hurt, near enough the Bed-ſide, to render the Operations and Dreſſings eaſy. I put a Handkerchief, or ſquare Cloth, within the Groin, which was ty'd by two diagonal Ends, to make a Loop that was taken by an Aſſiſtant, who held it without moving; then I made a ſecond graſp the Thigh with both Hands above the *Condyles*, and a third took the Leg: This done, I made them draw a little, not ſo much to reduce it, as to give the Thigh its due ſtreightneſs, a Circumſtance that ought always to be obſerv'd before the Operation is begun, both becauſe the Motions excited by Pain are leſs hurtful, and becauſe to make an Inciſion the Parts muſt be as much as poſſible in their natural Situation. Manual Operation

My Finger being introduced into the Wound, was the Conductor of the *Biſtouri*, wherewith I cut all the dilacerated Parts above and below, which facilitated the evacuation of a great deal of Blood already coagulated, and the taking out of divers pieces of Bones ſeparated from their Original. I diſcover'd with the ſame Fore-Finger, the Stays which the Parts leave by their ſeparation, and I cut them all, eſpecially thoſe that are always form'd by the *Aponeuroſis* of the *Faſcia lata*, which ought to be cut aſunder, without any other aparent Reaſon than the fear of Defluctions; that never fail accompanying the Obſtructions caus'd by the Inflamation of this *Aponeuroſis*, and the Swelling of the Muſcles which it covers; which Swellings alſo happens at the ſame Time.

This done, I made them compleat the Extenſions, whilſt I guided the Bones with my Fingers,

Fingers, and replaced them in proportion as they drew the Limb.

'Tis not ſecure in this Caſe to ſuffer the Bones to be again cover'd with Fleſh, for which Reaſon I dreſs'd the Wound with dry Lint, and Linnen Rags, ſo as to keep them bare till the Exfoliation; the reſt was apply'd, I placed the Part affected, and bled the Patient twice in 12 Hours, and next Day a third time before the taking off the firſt Dreſſing: At the third Dreſſing I left the Linnen Rags that I had put on, near the Bone; ſo that the Ends of the Bones were (if I may ſo ſay) wrap'd up in them, and not in a condition to hurt the Fleſh by their ſharp Points, they were even faſtn'd on that they might not be diſplaced by ſlight Motions.

Practice.

At the third Dreſſing I took off all, and clap'd on great Doſſels, which had the ſame Effect on the Bones as the Linnen Rags; they were ſteep'd in Brandy, and thoſe which fill'd up the reſt of the Wound, were arm'd with a ſimple Digeſtive, quickned with a little Brandy. The whole was cover'd with Compreſſes, and a proper Bandage, as ſhall be very exactly deſcrib'd in the complicated Fracture of the Leg.

Third Example.

I cou'd give great numbers of Examples of this ſort, but I have choſed only thoſe wherein I have found the greateſt number of Circumſtances met together, and I hope it will be ſufficient to clear up this matter entirely. The preſent Caſe is of a Fracture of the Thigh, made by Gun-ſhot: Two Balls were entred in at the middle of the Fore-Part of the

the Thigh, whereof one went out at the middle of the Hind-Part, an Inch lower than where it entred, and the other remain'd in the Thigh. The *Femur* being broken into ſeveral Pieces, and a conſiderable *Hæmorrhage*, might have determin'd us to an Amputation, if the Patient had not ſhown all the Reſolution, and all the Courage that is neceſſary to bear up patiently under the Pain of the Dreſſing, and the fatal Accidents that happen during the Courſe of ſo long a Sickneſs; wherein one is leſs certain of a Cure in endeavouring to preſerve the Limb, than in reſolving to cut it off.

I cut open the Patient's Breeches, and ſtraiten'd his Thigh, which was bent, by his Fall after receiving the Shot, like a broken Stick; I tented the Wound with Lint, which I faſten'd on with a Band; after which they made a Litter, and he was carry'd into his Tent, and laid upon his Field Bed, ſo as to facilitate the neceſſary Operations. The Dreſſings being all ready, I made them hold the Foot, draw the upper and lower Part of the Thigh as has been ſaid above; then carrying my Finger towards the broken Bones, I compleated the Dilatation at the Bottom, and made that at the Top, being conducted thro' the whole by my Finger. I drew out thro' this Wound a great deal of clotted Blood, which diſcover'd the opening of the Veſſel, whereon an Aſſiſtant put his Finger, whilſt I dilated the Wound behind, by cauſing the Thigh to be a little rais'd, and turning the Patient on his ſound Side, I drew out but little clotted Blood by this new opening, which I made larger, but got a great many fragments of Bone, and bits of the Cloth of the Breeches, that the Balls had

Manual Operation.

had driven in. I then ſearch'd for the ſecond Ball, and found it in the *Vaſtus Externus*, near the Skin, and the ſmall Head of the *Biceps*, about an Inch on one Side of the Place where the other Ball went out. To extract it I made no difficulty of cutting the Skin and Muſcles a-croſs from the Inſide to the Outſide, from the place where the Ball that made the Wound went out, to that thro' which this wou'd have iſſued, had it continued its Way. One may without fear of diminiſhing its action, and without danger, cut a-croſs ſuch little Parts of ſo large a Muſcle as the *Vaſtus Externus*.

Remark.

Having made what Dilatations were proper, and drawn out all the extraneous Bodies, I replaced the Thigh in its right poſition; then I made the Finger be taken off the Veſſel, and paſs'd a crooked Needle with a double Thread of that ſort, call'd *Fil d'epinay* from Top to Bottom, and again from Bottom to Top, and ty'd the Veſſel in a double Knot. I cut off the Thread within two Fingers of the Veſſel, and laid upon the Knot a Compreſs of an Inch Square, and four Lines thick, I trimm'd the Wound with Dozels, and eſpecially the Ends of the Bones, as has been ſaid in the foregoing Example; then I put over them a Compreſs four double, and apply'd the Dreſſing proper for complicated Fractures.

Remark uſeful for young Pupils.

When the Veſſel is not ſituated in a place convenient for the Paſſage of a Needle, they make uſe of a Doſil ſteep'd in Styptick Water, well ſqueez'd out, that this Water may not ſpread over the Wound, becauſe it is both

useless and hurtful there. In applying this, they wipe the Part well whence the Blood issues, and they clap on the Dosil steep'd, at the very instant that they withdraw the Linnen that has wip'd the Vessel; the one must be placed immediately upon the removal of the other, because if the least Time be lost, the Blood that issues out weakens the force of the Stypt'ck, wherewith the Dosil is impregnated, which hinders its Operation. Upon this they put a Compress like that which was upon the Ligature, and support it in the same manner by a number of Dosils, which they raise a Fingers breadth above the Level of the Wound, to the End that the Compress which is laid over it, and the Bandage that contains all, may compress this part more than the rest, without which the Dosil wou'd be forced off by the Effusion of the Blood, and the *Hæmorrhage* wou'd begin afresh.

If the Vessel shou'd be near the Bones, it must be stop'd by compressing it, so as that among the Dosills, there may be one that may press upon it above, whilst the Bone resists underneath. The Dosills must not be steep'd in Styptick Water, but they must be rais'd in the same manner a Fingers breadth above the Wound, and the rest must be apply'd as above.

If one does not use Styptick Water on this Occasion, 'tis because one ought to be apprehensive of laying the Bone more bare than was done by the Fracture. It ought also to be avoided if the Vessel shou'd be near the Tendons, Nerves, or other sensible Parts: Compression must, as much as possible be prefer'd to the Ligature and to the Styptick; when the

Vessel

Veſſel is not conſiderable it always ſucceeds; but when it is the Ligature ought to be preferr'd: And if 'tis impoſſible to put that in Practice, the Stypticks muſt be us'd not only liquids, as the Styptick Water of *Rhabel* or any other, but even Solids, as Buttons of Vitriol.

You wou'd perhaps be at a Nonplus if a Veſſel were open'd at a diſtance from the Bone, and in a place where the Ligature were impracticable, and the Stypticks dangerous. To determine you, remember that all other conſiderations muſt be paſt by when the Buſineſs is to ſtop the Blood, therefore don't be apprehenſive of touching the Bones, the Tendons, nor the Nerves, but of your Patient's periſhing thro' loſs of Blood, and even if you had neither Needle nor Styptick, your Genius and Sagacity will furniſh you with a ready Way to Stanch the Blood by the Compreſſion alone: The Genius of a Surgeon muſt find him Reſources every where, even in places where Nature ſeems to have deny'd them.

Having thus provided Remedies for the *Hæmorrhage*, drawn out the extraneous Bodies, replaced the Bones, trimm'd their Ends that they might not hurt, dreſs'd the Wound, apply'd the Bandage, that ſhall be deſcrib'd in the complicated Fracture of the Leg, having preſcrib'd all that had regard to the Regimen, it was neceſſary to provide for the Tranſportation of the Patient from the Camp where he was, to the neighbouring Town. To compaſs this without danger, I had two long Sticks made, of an Aſh which I order'd to be fell'd, and fitted to the Field Bed whereon the Patient lay, the two Ends paſſing behind

and

and before in the ſhape of a Litter, which was laid upon two Mules, and carry'd ſoftly to the next Town. The Mules were unloaden, and the Bed was carry'd into a low Parlour prepar'd for this purpoſe, and there I thought of all that was neceſſary to dreſs the Patient conveniently, and procure him a way to ſatisfy his Occaſions with Eaſe.

To ſucceed in this important Point, regard muſt be had to the ſituation of the Part, and of the whole Body; the Part ought to be in ſafety, and the Bandages ſuch as can be undone and clapt on again without ſtirring the Limbs; for this reaſon in a Fracture of the Thigh, where there is a Wound underneath, I adviſe not to Sow the Bandage with 18 Tails, but let all the Pieces be ſeparate; ſo that there may rather be a Band with Nine Ends, than a Bandage cut into Eighteen, that theſe Ends of the Band may be chang'd altogether if requiſite, or each by it ſelf, as there is occaſion.

Secondly, The Longitudinal Bolſters that are placed at the lateral Parts, muſt be thicker than thoſe uſed in other Fractures; they muſt be large enough to take up, both within and without, as much as poſſible of the under Part of the Thigh, and they muſt come near each other at the upper Part, not leaving above one Fingers breadth from one another.

Paſt-boards are not the beſt Things to retain the Bones, I prefer Splints of Tin varniſh'd, or the Bark of a Tree, becauſe moiſture ſoftens Paſt-board, and then it no longer ſupports the broken Bones. Tin varniſh'd or the Bark of a Tree are firm by their ſubſtance, and the Tin reſiſts Moiſture by its varniſh. They make them of a ſhape agreeable to that

Dreſſing that is preferable.

that of the Part, and trim them with Compresses that they may not hurt, which done they tye them on with two or three Thread Straps of a Finger's breadth.

As to Junks or a Case, I know that each of them has its admirers, for which reason 'tis fit to relate the Qualities both of the one and the other, and leave you to your Choice.

The good of a Case, and of Junks.

The Case seems most secure, because being of Wood 'tis inflexible, but Junks well made have only a pliantness that is useful, and does not go so far as to allow the displacing of the Bones: I say more, atho' the Case be firm it does not so well support the broken Bones, because it is not ty'd with the rest of the Bandages; whereas the Junks are made fast with Straps. Nevertheless one may give a Case, this advantage by adding Straps to it.

They who prefer the Case say, that it forms an even Surface, and that on the contrary the Junks give way and conform themselves to the unevenness of the Bed, but they don't reflect that the equality of the Surface of this Case is a Defect, because it can't suit with the inequalities of the Heel, the Calf of the Leg, the *Condyles*, and the top of the Thigh. That if they endeavour to help this by Quilts, this Remedy is not sufficient because the Heel, the Calf of the Leg, and other places that stick out, will always bear much more upon them, then the places that sink in; these inconveniences are not found in the Junks provided one observes.

1°. That they have a great deal Surface, except in the End that approaches the Pudenda.

2°. That the Cloth which covers them make a great many Circumvolutions round the

Straw

Straw whereof they are made, to that degree that the Inequality may be taken away.

3°. That there be two Cloths to trim them, *viz.* One that covers them from that Part of the Junks, which is above the *Condyles* of the *Femur* to the bottom, and the other to wrap round them four Fingers above the Fracture to the Top; ſo that when they are put on, there will hardly be any of the Cloth of the Junks in almoſt all the hind Part of the Thigh, which will render the Dreſſings eaſier, as will be ſeen by the ſequel. That theſe two Cloths be cut after ſuch a manner, that what goes round the Junks be proportionable to the length of the little Junk plac'd on the inſide, and of the long Junk placed on the outſide; for the latter muſt go beyond the *Trochanter*, and both the one and the other below muſt reach only a Fingers breadth beyond the Sole of the Foot.

4°. The Junks muſt be faſten'd on, and trimm'd with Compreſſes, to fill up the empty ſpaces, to the end that they bear equally upon all the Parts, except thoſe that are painful, and eſpecially thoſe where the Wound is.

5°. The Compreſſes muſt be placed ſo that the Ankles, the *Condyles* of the *Femur*, the *Trochanter*, and the Groin be not compreſs'd.

6°. There muſt be a Compreſs half a Finger's breadth thick, and four broad, to go the whole length of the Thigh, the Leg, and part of the Foot, that the Straps may not hurt when they faſten on the Junks.

7°. The Junks muſt be bound ſo that they may be moſtly under the Part, that is to ſay, that the Limb reſts upon them, and is not encloſed in them.

8º. There must be six Straps, three to the Leg, and three to the Thigh; those of the Thigh must be first ty'd, and those of the Leg afterwards, beginning both in the one and the other by that in the middle.

9º. They place a Wooden Sole trimm'd with Linnen and two Straps, one great, one little: The great one must pass thro' Holes made in that Part of the Sole which is over against the Ankle, and the little one thro' other Holes, which must be at that Part of the Sole whereon the first Articulation of the Toes bears. The first Strap must be equally divided into two Ends, which after making a St. *Andrew*'s Cross upon the Instep, must be fasten'd to the Junks within two Fingers breadth of the Ankle; after which they must again cross each other several Times, and be fasten'd to the Junks, with Pins, forming as they cross each other Lozenges, as far as the upper Part.

The little Strap also crosses it self once at the Top of the Foot; and its two Ends must be fasten'd to the Junks, near the place where the great Strap was made fast at first.

10º. There must be other Junks a great deal softer, and with more Linnen upon them than the others, not cover'd with one Cloth, but separated, they are properly two *Cylinders*; they must be put underneath: The Straps of the inner Junks must go under, and come outwards, and those of the outward Junk must go under, and come inwards, so as to be fasten'd one to the other upon the Limb, to hinder their separation, which is essential, because they serve as a support to the true Junks; we will call these false Junks. Things being thus, the whole under Part of the Foot, Leg,

and

and Thigh will touch the Quilt but little or not at all, and will only reſt upon the Cloth of the firſt Junks, as upon a Hammock, wherein the whole under Part of the Heel, Leg, and Thigh are mounted, except the Place of the Fracture, as has been ſaid above; 'twill be ſeen by the ſequel how advantagious this management is to facilitate the Dreſſings.

For the reſt, there muſt be a Cord at the Cieling, a Board and a Billet at the Feet of the Bed for the uſes before mention'd. I paſs on to the means of procuring the Patient the Convenience of going to Stool, making Water, and taking his Drink and other Food.

There muſt be two Quilts, the one entire, and the other of ſeveral Pieces which may be adapted to each other, and taken away as need requires. One large Piece muſt reach from the middle of the Buttocks to the Head of the Bed, the reſt muſt be divided into four Pieces, two on each ſide; the one on the ſide that is hurt muſt begin where the upper part juſt mention'd ends, and muſt reach four Fingers breadth below the Fracture, and the other muſt begin from this, and reach below the the Foot; the two other Pieces muſt do the ſame on the ſound ſide, excepting that they muſt be larger according to the bigneſs of the Bed, ſo that it muſt conſiſt one third of the Pieces that ſupport the Part affected, and the two other thirds of thoſe that ſupport the ſound ſide.

When the Patient wou'd go to Stool, one muſt remove the middle Piece on the ſound ſide, then one Part of the Thigh and the Buttock of the Part affected will be without ſupport, and the Place that was taken up by this Part of the Quilt make room for the Bed-

Pan which may be given the Patient, and removed when he has done with it.

That the Piece of the Quilt may be eaſily replaced, there muſt be two narrow Girths, or Boot-Straps ſow'd to it, which paſs under that part of the Quilt that is on the wounded ſide; theſe Girths muſt be ſo drawn by one as not to move nor change the place of that part of the Quilt that ſupports the Fracture, and whilſt they are ſo drawn, others take care to facilitate the replacing of this part of the Quilt that has been removed.

If one wou'd give the Patient a Clyſter, this part of the Quilt muſt be again taken away, and that which is under the reſt of the Thigh and Leg of the ſame ſide; the Patient muſt be made bend his Knee, the Sole of his Foot reſting upon the ſecond Quilt, he removes his Knee as much as he can, which leaves all the ſpace that is proper between the Thighs for the introducing of the Pipe, and the management of the Syringe.

When the Patient has taken the Clyſter, only the lower part of the Quilt muſt be replaced, whereon they put the Patient's Leg, and they ſlide the Bed-Pan under, that he may give back his Clyſter, which when he has done, they replace the other part of the Quilt as has been ſaid.

Each of theſe four Pieces of Quilt muſt be wrap'd in Cloth, which ſerves as a Sheet, and is more convenient, becauſe a Sheet makes folds that might be troubleſome. The upper Part of the Quilt is cover'd with a Cloth or half Sheet, which having no communication with the four other lower Pieces, does not at all hinder one in removing or replacing them, theſe Cloths muſt be chang'd when they

they are dirty, and be waſh'd, to keep the Patient clean.

To dreſs the Wound they draw away the Piece of the Quilt which is under the Fracture, and has like the other two Girths or Boot-Straps that go a-croſs the Bed under the oppoſite Piece; theſe are long enough, not only to give Liberty to remove the Piece of the Quilt, but alſo to leave Ends ſufficient to take hold of again, and draw them back, when one would replace the Quilt after the Dreſſings.

When this Piece of the Quilt is drawn away, the broken Piece of the Thigh is entirely open, and there is Liberty to put ones Hands on all Sides to take off the Dreſſing, and lay it on again without running the Riſque of diſturbing the Fracture; then the Straps of the falſe Junks muſt be looſen'd, and whilſt one raiſes gently all the Limb ſupported by the true Junks, the falſe ones muſt be taken away, and the Limb be laid down bound in theſe Junks.

Two Aſſiſtants muſt hold, one the Foot, and the other the Top of the Thigh, only to preſerve its Streightneſs, and oppoſe the Startings and other involuntary Motions of the Patient; they unty the Straps of the true Junks, keeping in its Place that which is on the inſide, and unrolling that which is on the outſide, to unwrap the two Cloths that ſurround it; they draw the upper Cloth a little upwards, and the lower downwards, to give more Eaſe; they untye the Paſt-Boards, or Tin Plates, and they take off conveniently all the Dreſſings, obſerving not to touch the Compreſs that is laid upon the Ligature of the Veſſel, or upon the Button or Doſſil that has been made uſe of to ſtanch the Blood; for, in the Example that I have given, there was a *Hæmorrhage*.

The whole Dreſſing being taken off, the Situation and Figure of the Bones muſt be examin'd, that they may be remedied by replacing, if they are ſeparated, and by cutting their ſharp Ends with the inciſive Pincers, if they are like to prick the neighbouring Parts; then one muſt dreſs the undermoſt Wound firſt, becauſe the Medicines that run down from the upper Wound when 'tis dreſſing are retain'd, and don't ſpread as they wou'd do, if it were dreſs'd before the under one.

It muſt always be obſerv'd, in dreſſing both the one and the other, to cover and wrap round well the Ends of the Bones with fine Linnen, or Pledgets ſteep'd in Brandy; and eſpecially not to diſorder the Compreſſes or Doſſils that compreſs the open Veſſels. The reſt of the Doſſils or Pledgets muſt be arm'd with a ſimple Digeſtive, only quicken'd with a little Spirit of Wine, or good Brandy. Both the one and the other muſt be incompaſſed with a Compreſs ſteep'd in Brandy; then one muſt lay on the 9 Ends of the Bands, inſtead of the Bandage of 18 Tails; after this the longitudinal Bolſters, the Paſt Boards or Tin Plates varniſh'd muſt be clapt on, and faſten'd with their Straps; the upper and lower Cloth that was a little remov'd, the one upwards, and the other downwards, muſt be brought back and carried near each other to faſten it as it was, the Sole muſt be replaced, and the Limb raiſed to put on the falſe Junks, which muſt alſo be bound on as they were: This done, the Piece of Quilt that was taken away to facilitate the Dreſſings, muſt be reſtor'd to its Place. If the Space that this Piece of Quilt leaves in the Bed ſhould not be ſufficient to facilitate the Dreſſings, a like Gap may be made in the under Mattreſs,

and

and even in the Straw-Bed, that one may have all the Liberty that can be deſired.

I don't know any more convenient Way of dreſſing the complicated Fractures of the Thigh, it ſeems to me to anſwer all the Ends that can be propoſed in this melancholy Diſtemper, which, as I have ſaid, is leſs dangerous when the Limb is cut off, than when one endeavours to preſerve it: If any Doubt remains, you may have Recourſe to the Fracture of the Leg both ſimple and complicated.

CHAP. XIII.

Of the Fracture of the Rotula.

THE *Rotula* is faſten'd at Bottom to the Protuberance of the *Tibia* by a ſtrong Ligament, which has been taken, but without Reaſon, for a Continuance of the *Aponeuroſis* of the *Extenſors* of the Leg: At its upper Part, the ſame *Rotula* gives Inſertion to the ſtrong *Aponeuroſis* that is form'd by the crural Muſcles, the *Rectus Anterior*, and a Part of the two *Vaſti*; ſo that when the Leg is either ſtretch'd out or bent, the *Rotula* follows the Determination and Motion of the Muſcles.

If our Knee is bent, it is obſervable that the *Rotula* is drawn downwards by the Weight of the Body, which influences the Ligament that keeps the *Rotula* faſten'd to the *Tibia*, and that it is at the ſame Time drawn upwards by working of the *Extenſors*. If the *Rotula* can reſiſt theſe oppoſite Determinations it will not break, on the contrary it will, if it cannot

withſtand them. That what I have ſaid may be the better underſtood; I ſuppoſe that a Cord is faſten'd to a fix'd Point, as a Cramp-Iron fix'd in a great Wall, and the other End of it to a Horſe's Shoulders: Suppoſe again that the Horſe draws this Cord with a Hundred Degrees of Strength, I ſay, that they will endure the Effort of almoſt 200 Degrees, becauſe the Reſiſtance of the Cramp-Iron is equal to the Force of the Horſe; and if there be any weak Part in this Cord that can't withſtand 200 Degrees of Force, that Place of the Rope will break. In the like Manner, ſuppoſe the Weight of the Body that acts upon the Leg when bent, makes an Effort to draw the *Rotula* down, whilſt the *Extenſors* ſtrive to draw it upwards; I ſay, that if any Part of the *Rotula* be too weak to oppoſe both theſe Powers, it will break in that weak Part, ſo that the *Rotula* will make two Pieces, the one kept fix'd to the *Tibia* by the ſtrong Ligament beforementioned, and the other carried upwards by the Influence of the *Extenſors*. 'Tis plainly ſeen that if in any violent Fall, the Line of Gravity falls upon the Leg, and the Leg be bent, the *Extenſors* will ſtrive to ſuſtain the Weight of the Body, and the *Rotula* at that Time will be kept below, by Reaſon of its being faſten'd to the Leg, altho' the Muſcles ſtrain to draw it upwards. The Forces being equal, and contrary to each other, it will remain at Reſt, provided the Tendon and the Muſcles have Strength enough to bear up againſt the Weight of the Body; if not, either the Ligament that faſtens the *Rotula*, or the Muſcles that draw it upwards, or the *Rotula* it ſelf muſt break. It will remain at Reſt, becauſe the Powers are equal; but as the Ligaments and the Muſcles are leſs brittle,

they

they continue entire, the *Rotula* breaks, and the Piece on the upper Side is carried away by the Muſcles. I have ſeen ſeveral *Rotulas* broken by falſe Steps and Strains, without their having been ſtruck at all; and if at any Time the *Rotula* appears to have been ſtruck, one ought not to accuſe the Blow of having made the Fracture; it would never break, if it were not drawn ſtrongly upwards, and retain'd below, as we have ſaid. What I ſhall ſay hereafter in ſpeaking of the Rupture of the Tendons, will better prove what I advance.

The Fracture of the *Rotula* is eaſy to be diſcover'd, the Finger need be only laid upon the Knee, and the Separation of the upper Piece may be felt; and if it is carried up conſiderably by the Action of the Muſcles, it is eaſily perceived by the Touch. The lower Piece neither mounts up nor falls down, becauſe it is not faſten'd to any Muſcle, wherefore 'tis eaſier to be found than the upper Part.

According to what has been ſaid, the *Rotula* almoſt always breaks a-croſs, and it is impoſſible it ſhould break long-ways, unleſs the Fracture be complicated, as when 'tis broken by a Gun-ſhot, a Splinter of a Bomb, an Axe, a Club, *&c.*

When the Piece that is mounted upwards is but ſmall, it is harder to diſtinguiſh the Fracture, but 'tis leſs dangerous, tho' more difficult to reduce; becauſe that it not uncovering ſo much of the Joint, gives leſs Room for the nutritive Juice that forms the *Callus* to diffuſe it ſelf in the Articulation, which would cauſe an *Anchyloſis* of the firſt Kind; for 'tis almoſt an inevitable Conſequence, in all Fractures of the *Rotula*, for the Juice that flows from the two broken Ends, to ſpread in the jointing of

the

the Leg, and ſolder the articulated Pieces, or at leaſt render the Motion very harſh, forming a ſort of rough Cruſt upon the Surface of the Cartilages, which ought naturally to be ſmooth, to the End that the Bones may ſlip one againſt another with Eaſe.

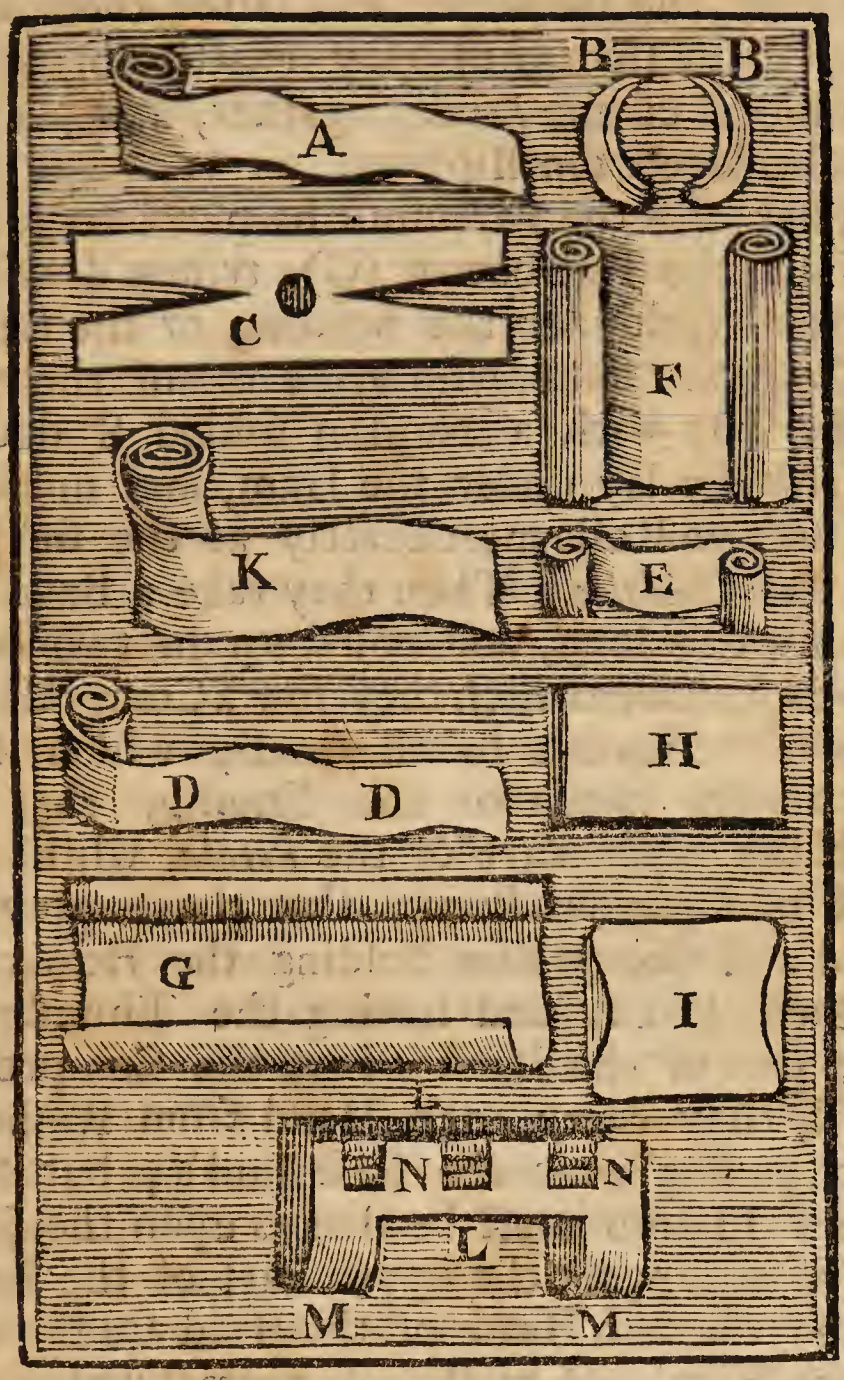
Thoſe who have not the *Rotula* ſet, find a great Difficulty in walking; becauſe that, beſides the Effuſion of the nutritive Juice in the Joint, Anatomy teaches us that this Bone ſerves for the Adheſion of the *Aponeuroſes*, and that in its natural State it is as a Pully, and removes them from the *Fulcrum* of the Leaver of the Leg, of which Advantages the Patient is then deprived, and which are of great Uſe for walking ſtrong and faſt.

To reduce the *Rotula*, the Sole of the Foot muſt lean againſt ſomething that is ſteady, the Leg being well ſtretched out, then making uſe ſucceſſively of ones two Thumbs, one brings it down by little and little into its right Place. Great Care muſt be taken not to bend the Leg for any Cauſe whatever; becauſe that wou'd remove the Piece of Bone farther than it is; this is ſo true, that it hardly mounts up at all, in ſuch as immediately ſtretch out their Leg after the Fracture, and it gets up almoſt to the middle of the Thigh in thoſe who fall wholly with their Leg bent, or in thoſe whoſe Legs have been bent to find out the Fracture.

This Remark is ſo eſſential, that the Succeſs of the Cure depends almoſt always upon it; in effect, altho' the *Rotula* be broken there ſtill remain ſome Parts of the *Aponeuroſis* that retain it, which are deſtroy'd by bending the Leg.

When

When the *Rotula* is in its place, it muſt be kept there by a Bandage, that may be made differently; ſome firſt make a little Bandage with the Roller (A) which forms a Figure of 8 with two Tails, and goes but two rounds; after this they put on the Rolls of Linnen, or



Plaiſter (BB) upon and under the broken Bones, in the Figure of a Creſcent; they are cover'd with the Plaiſter, with four Ends (C) which ſome put under the Creſcents, immediately upon the *Rotula*, but it is better

to

to lay it over them; then they make a Bandage with a larger Band, which forms a Figure of 8 like the firſt, and is made with the roll'd Band, with one Head (DD) or that with two Heads (E), and after 'tis put on they turn up the four Ends of the Plaiſter (C) over the Bandage, and faſten them with Pins, ſo as that they may exactly bring the two Pieces of the *Rotula* together, and prevent the Bandage from ſlipping.

After this the Part muſt be put into Junks, or into the Paſt-board (G) trimm'd with a Napkin, to hinder the bending of the Leg.

There are ſome who make uſe of the falſe Junks (F) with a Napkin folded 8 double, which they lay under the Ham, and unroll ſo as the two Rolls meet exactly at the ſmall of the two *Condyles*. Then they take a Band like (E) ſix Ells long, and roll'd up in two equal Heads, between which they ſow a Compreſs half Finger's breadth in thickneſs, which they put in the place of the Thumb, that has kept the upper Part of the *Rotula*, whilſt you were taking your Band; then they apply the Band and Compreſſes holding the Heads one in each Hand, and having the Thumbs on that part of the Band where the Compreſs is ſow'd, they carry each Hand from Right to Left, paſſing over the falſe Junks; but ſome bodies Thumb muſt be always upon the Compreſs, to ſupport the upper Part of the *Rotula*. When the two Heads of the Band are brought to the Ham, one muſt croſs them by changing Hands, to carry them like a Creſcent under the lower Part of the *Rotula*, which is alſo cover'd with the Compreſs or Creſcent (B): The two Heads muſt be ſhifted from one Hand to the other, and guided obliquely

liquely under the Ham, as they come upwards, where they muſt croſs each other to make them paſs over the round, and the ſame muſt be continued to the end of the Band, bringing the Truſſes near, by little and little, that the Pieces may be bound the cloſer. When this Band is ended, the Compreſs (H) four Fingers broad, and as long as the falſe Junks muſt be placed upon the fractured Part, and the Paſt-board (I) half a Foot broad under the Ham; the whole muſt be kept on by the Band (K) which at firſt makes two or three Caſts round the lower Part, and afterwards two oblique turns that muſt croſs each other upon the *Rotula*, then two caſts round the upper Part, and may end where it will. The Part muſt be placed in Junks, and laid upon a Pillow, rais'd towards the Foot, to keep the Leg extended, and facilitate the motion of the Fluids: The ſame Precautions muſt be taken in dreſſing the Fracture. The *Callus* is 50 Days in forming, or at leaſt before 'tis firm enough to allow of the Patient's walking.

I have ſince contrived a ſort of Frame which ſerves me inſtead of the falſe Junks: It is made of *Turkey* Leather, lined with Shammy, and has four Notches or Holes, that ſerve to retain the turns of the Band, as may be ſeen in the Figure. (LL) make the two ſides, and (MM) the Semicircles, whereof one goes round the upper, and the other round the lower Part of the Ham, (NN) are the Branches which retain the Caſts of the Band by their unevenneſs.

Obſervation

Obſervation of Conſequence.

On all Occaſions wherein any Motions muſt be made, to replace the broken Bones, one muſt avoid thoſe that are uſeleſs; Pain is not of ſo little moment as to be cauſed for nothing: An Obſervation that was communicated to me in publick will ſerve to prove what I ſay, and that I may alter nothing, I ſhall quote here the Letter juſt as it was given me by the Clerk of St. *Coſmus*, in the preſence of the Audience, as I was reading my publick Lectures.

SIR,

" AN Accident happen'd ſome Days ago " to a Man who fell upon his Knee, " and a Surgeon was ſent for who cou'd not " diſcover any Diſplacing: After this, by " reaſon of the great Pain the Patient felt, a " Maſter Surgeon, who was very skilful was " call'd in, who cou'd no more find any Fra- " cture nor Luxation than the firſt, therefore " he order'd what was proper.

" The Patient or the Aſſiſtants, not being " ſatisfy'd with this, ſent for a *Maſter Bone-* " *Setter*, who immediately examin'd the Part, " and perſuaded the Patient and the Aſſiſtants " that there was a Diſlocation, which was not " hard for him to do, by reaſon of the Pain the " Patient was in. Hereupon he ſet himſelf about " reducing this pretended Luxation, and be- " gan to bend the Leg to the Buttocks with " all his Strength, and to ſtretch it out, which " cauſed ſuch acute Pain that the Patient " ſwooned away. Upon this he left off his

" Ope-

" Operation to recover the Patient, which " being done, the Workman began his Work " again, and the Patient ſwooned a ſecond " time and Died upon the Spot. Wherefore, " Sir, do us the favour if you pleaſe to tell " how this cou'd happen.

Anſwer to the Letter.

FIRST, One may obſerve, that the Patient had been viſited by two Perſons, who ſeparately were of Opinion that there was nothing diſplaced; but let us ſuppoſe for once that there was a Diſlocation, I ſay, that this Bone-Setter ought not to have made theſe murdering Extenſions, for it is certain that one ought not for any Caſe whatever to bend the Leg either at the Time or after the manner that this the Bone-Setter did.

The Time that the Patient felt ſuch acute Pains was not proper to make the Extenſions. If the Bone-Setter had read the Pages of the firſt Volume of this Treatiſe, where the Time and Manner of moving the Joints is ſpoken of, perhaps he wou'd not have committed this fault. In that Part of the firſt Volume, one may ſee how and which way the Limbs muſt be moved, and above all, 'tis obſerv'd there, that the Fore-Arm ought never to be bent ſo as to make it touch the fore part of the Arm, nor the Leg ſo as to bring it to the hind part of the Thigh, on any Account whatſoever. The Fracture of the *Tibia*, and that of the *Femur*, near the Articulation of the Knee, only require Extenſions and Counter-Extenſions in a right Line.

The Luxation of the Leg has no need of any other Motions; and whoever in Fractures

of

of the Joints ſhou'd make a Motion of Flexion, wou'd rather diſplace the Bones than join them. 'Tis true, that in a Luxation one may make a little Flexion and Extenſion to replace the Bone, but this ought to be done gently, and as it were to try whether the Joint can make all theſe Motions.

If the Bone-Setter ſhou'd tell me that the *Rotula* was diſlocated, he wou'd not juſtify his Management a jot better, becauſe it is certain that only continues luxated becauſe it is ſtrongly forced againſt the *Condyles* of the *Femur*, by the exceſſive ſtretching of the *Extenſors*; wherefore to replace it, this Extenſion muſt be leſſen'd by ſtretching out the Leg as much as poſſible, then one brings the Inſertion of the *Extenſors* near their Origin, which relaxes them a little, and renders the reduction of the Bone eaſy.

If the Bone-Setter ſays there was a Fracture, 'tis ſtill worſe, becauſe it has been demonſtrated in the Chapter of the Fracture of the *Rotula* that the Flexion of the Leg is hurtful: The Structure of the Part is ſufficient to prove it. Nevertheleſs he muſt have an excuſe, and won't fail to ſay that the ſtarting of a Nerve was the Ail that caus'd him to make theſe extraordinary Motions. I will ask what he means by a Nerve ſtarted: If he means that ſort of convulſive Motion that is known thro' the World under the name of *ſtarting*, all the World will ſee that he was in the wrong to make theſe Motions, they are not proper, and wou'd be more apt to make it ſtart then to cure it. Does he underſtand by the ſtarting of a Nerve the diſplacing of the Tendons? Let us forgive him this Expreſſion in favour of his Ignorance;

but

but let us not confirm People in this Error, for the Tendons cannot be diſplaced without breaking (as will be ſeen in the Chapter that treats of this Subject) or unleſs there be a Luxation or Fracture, beſides this does not happen after the manner that he may underſtand it, but as it has been explain'd in the general and particular Treatiſes of theſe Diſeaſes.

Wou'd he ſay that the Tendons may come out of their Sheaths? The Structure alone proves that it cannot be; and ſhou'd one grant a poſſibility of it, nothing wou'd be more contrary to replace them than the violent Motions we have ſo much blam'd: And if one wou'd grant what is not fact, that one ſhou'd bend and ſtretch out the Joints with Violence, to replace the Tendons when out of their Sheaths, this wou'd only be for thoſe Joints where the Tendons have Sheaths, it cou'd not be for the Knee, where 'tis known that the Tendons which move it have no Sheath.

I conclude that the Pain proceeding from the uſeleſs Extenſions, may have been the Cauſe of the Patient's Death.

CHAP. XIII.

Of the Simple Fracture of the Leg.

IF there is any thing wanting in this Chapter, you may have recourſe to the general Cure of Fractures, whereon I have enlarged

very much; nevertheleſs I hope that you will find in this enough to ſatisfy you.

Structure. The Leg is compos'd of two Bones, the moſt conſiderable is the *Tibia*, which forms the whole Articulation with the Thigh, and moſt part of that of the Foot. The leaſt conſiderable is the *Perona*, which contributes not at all to the forming of the Articulation of the Knee, and only makes the external limit of that of the Foot, which is call'd the Ankle, or the *Malleolus Externus*.

The Kinds. Theſe two Bones may be broken both together or ſeparately; ſometimes the one is broken above and the other below, ſeldom both in the ſame place, except when the ſame Cauſe acts at the ſame Time upon both, upon both, as the Wheel of a Waggon, Coach, *&c.*

When the Leg is broken by a blow that only ſtrikes the *Tibia*, this Bone only is broken at the Place that is ſtruck, and the *Perona* ſometimes is fractured by the fall of the Patient, becauſe this Bone is not able alone to ſupport the weight of the Body; in ſuch Caſe the fracture of the *Perona* is generally diſtant from the Place where the *Tibia* is broken: We ſee that in falls the *Tibia* and the *Perona* generally break, one in one Part and the other in another.

Sometimes there are Shivers or Splinters ſeparated from the body of the Bone, but ſtill adherent to the Fleſh.

'Tis even ſeen that the ſame Bone breaks in two or three Places, and its Fractures ſometimes happen near the Joint, or even in it, as the *Malleoli* have been known to be broken.

The fractured Ends have different Figures, and ſuffer various diſplacings.

Signs. The Signs are diſcoverable by the Sight, the Hearing, and the Touch: It may be ſeen

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if the Leg has loſt its ſtraitneſs, and its ſhape; the Crepitation may be heard when one moves the Part, and the Bones grate againſt each other; and the unevenneſs may be felt with ones Fingers by running them along the inner Surface of the *Tibia*, or along its Creſt.

Signs of the Fracture of the Tibia.

The Fracture of the *Tibia* only is eaſily diſcover'd, becauſe the internal Surface of this Bone is not cover'd with Muſcles; but the Fracture of the *Perona* is hard to be found out when the *Tibia* is not broken.

To be aſſured whether the *Perona* be broken, one muſt graſp with one Hand that Part of the Leg which is below the *Gemelli*, and with the other the Sole of the Foot near the Heel, and then turn the Foot alternately out and in, to thruſt the *Aſtragalus* againſt the *Malleolus Externus*, and move the *Perona*. If 'tis whole the Hand that holds the Leg will be ſenſible of it by its Reſiſtance; and if the Bone is broken, it will be perceiv'd by the Crepitation.

When one is certain of the Fracture, and has a juſt Idea of the Place where the Bone is broken, and as near as poſſible of the Figure of the broken Pieces, the Part muſt be ſhav'd if 'tis Hairy, and the Reduction made.

Example.

Suppoſe both the Bones of the Leg were fractur'd four Fingers breadth above the Ankles; the Patient being laid in his Bed, with the broken Leg as near as poſſible to the Side, to facilitate the Operation, an Aſſiſtant muſt put the four Fingers of both Hands very gently, the one within, and the other without, below the Articulation of the Knee, where the Calf of the Leg is not quite at the largeſt: His Fingers muſt be lock'd in one another to ſtrengthen his hold, and the two Thumbs muſt

Manual Operation.

be extended before, to take hold of the Leg below the Prominence of the *Tibia*. Another Assistant, stronger than the first, being placed at the End of the Bed, must put the Fingers of both Hands under the Leg above the Heel, locking them one in another like him who holds the upper Part, and even more, because the Part which he holds is not so large: He must bring his Thumbs forwards, so as to make them touch in a Parallel Line, to grasp the two Bones of the Leg circularly; then the Surgeon being on the outside of the Leg, with his Back to the Foot of the Bed, must take hold gently of the fractured Place with both Hands, the Fingers under, and his Thumbs above; he must order the two Assistants to draw each on their Part raising the Leg gently, whilst he at the same instant lifts up the fractur'd Part softly with his Hands, without making as yet any use of his Thumbs.

When the Leg is rais'd enough to facilitate the Operation, he must order the Assistants to draw strongly in a right Line, then he must work, with the fleshy Part of his Thumbs, placed one lower than the other, upon the fractured Part to replace the Bones.

This Operation which the Ancients call Coaptation or Conformation, is not always perform'd the same Way.

What has been just mention'd suffices sometimes, but the Surgeon is often obliged, that he may Compress the Part with more strength, and more exactly, to place the fleshy Parts of his Thumbs over against each other, to make an effort on the very Place that is fractured; sometimes the Thumbs do the business, and when all these means don't avail, one is obliged to make an Incision to lay the Bone open,

pen, and use the Elevatories, or the Trepan. I have hitherto avoided this Operation, (which is sometimes more fatal in its consequences, than cruel in its self) by using of Straps, instead of Hands, to make the Extensions strong enough; for the Difficulty of making the Reduction proceeds only from some Part of the Bone's, continuing to touch by its sides, and this Obstacle to the replacing them subsists no longer when the Extensions are sufficient: It may also depend upon the turn of a Hand to be made by him who holds the lower Part, sometimes to the Right, sometimes to the Left, at other times upwards or downwards, and always at the time that he is bid; he must not act without orders, and even ought to be well instructed, that he may execute them right; for this Reason one must not only place the Assistant that is strongest at the Foot, but also him that has most Experience. Remark.

As these Operations are sometimes long, one must at the beginning place the Assistants commodiously, that they may be able to keep in the same situation all the Time of the Reduction, and putting on of the Dressings.

This is the Time when the Assistant that held the lower Part of the Leg, above the *Malleoli*, must shift his Hands gently: If 'tis the right Leg, he must slip the Palm of the Left Hand under the Patient's Heel, his Thumb being at the bottom of the *Malleolus Externus*, and the four Fingers at the bottom of the *Malleolus Internus*; he must shift his right Hand with the same easiness by sliding it away, and without letting go his Hold, he must replace it so, as that the Palm of his Hand may be at the inner part of the Foot, his Thumb at the Sole, and his four Remark. Essential Operation.

Fingers may graſp the *Tarſus*, as near as poſſible to its jointing with the Leg. This changing of Hands muſt be done ſpeedily, exactly, and gently; preſerving the Leg in the ſame Poſture, and drawing always with one Hand, whilſt the other is removed, and then with both, when the ſecond is placed. During this the Surgeon always ſupports the fractur'd Part that it may not be diſorder'd.

Things being thus, the Surgeon muſt have his Dreſſings brought near him, which he muſt ſet in order himſelf, that without being at any trouble, he may find all the Pieces in the place he has laid them, which is as they are to be put on.

Dreſſing. He muſt take Simple Compreſs (A) ſteep'd in Aromatick Brandy, holding it by the two Corners that are not cut with the Ends of his Thumbs and his Fore-Fingers, the latter being placed underneath and the former at the Top: He muſt carry the Compreſs on the inſide of the Leg, and letting fall his Hands with the Ends of the Compreſs on the outſide of the Leg, he muſt take hold of the Ends that are cut with the Middle-Finger, and other Fingers of each Hand, and muſt draw them outwards from the inſide over that end of the Compreſs that is not cut, which end muſt be made faſt underneath, by little and little, letting go the Thumbs by degrees, till the two ends of the Compreſs that are cut have entirely cover'd the other, and go over it to finiſh their Circumvolution. One muſt avoid Folds and Ruffings which would cauſe Pain.

Application of the Simple Compreſs.

This Compreſs being put on exactly, one muſt take the firſt Band (B) three Ells and a half

half long, more or leſs according to the ſize of the Leg; it muſt be at moſt but three ſmall Fingers broad, and muſt be unroll'd eight or ten Fingers breadth, the ſmall end muſt be dipt in Aromatick Brandy, that it may ſtick and not ſlip.

To hold the Band well, and put it on with more eaſe, one muſt keep the Roll in the Palm of the right Hand, if 'tis the right Leg, the Thumb being placed on that ſide of the Band that unrolls, and the four Fingers on the oppoſite Side; the End that is unroll'd is held between that Part of the End of the middle Finger that is oppoſite to the Nail, and the Nails of the Fore and Ring-Finger, or elſe 'tis held by the Thumb and the Fore-Finger, the firſt way is the moſt convenient. Application of the firſt Bandage.

The Band being held thus, the Surgeon muſt turn the back of that Hand that has the Roll towards the Leg, and bringing the Band and his two Hands within an Inch of the Leg, he muſt put the End of it held by his left Hand under the Leg, beyond the inſide of the Tendon of *Achilles*, near the Internal Surface of the *Tibia*, over againſt the Fracture, where the End of the Band will be eaſily faſten'd, becauſe 'tis wet, and reſts upon the Compreſs. The unroll'd Part of the Band muſt be carry'd thither with the right Hand, and when it has been unroll'd and carry'd down perpendicularly the length of ſix Fingers, the left Hand muſt take the roll at this Place, and the four Fingers of the right Hand replace themſelves ſlightly within the inner Part of the Leg upon the Fracture, to follow the Band underneath, where they muſt remain to ſupport the fractured Pieces, whilſt the left Hand finiſhes the firſt circular caſt

of the Band, and unrolls it by carrying the Roll perpendicularly upwards, where the Band muſt be unroll'd five or ſix Fingers breadth, and where the right Hand muſt take it again, without moving it till the left Hand has taken its Place under the Leg to ſupport the Fracture, till the right Hand has finiſh'd the ſecond Caſt of the Band, which it does by carrying what is unroll'd of this Band over the firſt Caſt; then continuing this Method, they make a third Caſt, and begin the firſt Truſs going upwards. This firſt Truſs ought not to be above two Lines diſtant from the third Caſt; the ſecond Truſs two Lines and a half, the third three Lines, and the others but four Lines, or four and a half at the moſt. They continue always the ſame Method alternatively; one of the Hands ſupports the Part, whilſt the other makes uſe of and carries round the Band.

It muſt be obſerv'd that the Leg being ſmaller at the Place where we have ſuppos'd the Fracture, the turns of the Band can't
Remark. be made going upwards towards the Calf of the Leg, but there will be a Pucker, that is to ſay, an empty ſpace at the Place which the Band don't bear upon.

To avoid this Inconvenience ſeveral Methods are propoſed, ſome wou'd fill up, and equalize the Leg with Compreſſes from the Heel to the Calf, before the putting on of the firſt Band; others don't trouble themſelves about Folds or empty ſpaces; and others again make Reverſes. I will propoſe a fourth way to take up the Band, wherein I have had very good Succeſs.

As for Compreſſes, I wou'd not adviſe the putting them on before the firſt Band, becauſe

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the Circumvolutions muſt be as near the Fracture as poſſible, to retain the Bones the better in their Places.

They who let the Roller be rumpled fall into two Incoveniences, firſt they only compreſs the Part by the upper Edge, as a Cord or narrow Ribband wou'd do, which is not proper, and ſecondly the lower Edge of the Band which has no ſupport, is looſe, makes a Pucker, and folds at the will of the Caſts of the Band that paſs over it: Theſe two inconveniencies render the Band uſeleſs; becauſe it don't contain the Part, and hurtful; by reaſon it plaits and rumples ſo as to hurt the Patient.

The Reverſes therefore are much more convenient. In making them ſeveral things muſt be obſerv'd, 1°, to begin them where the Part growing larger won't allow the Roller to lye even; that is to ſay, when one perceives that if one continues to roll the Band it will make Puckers, or Rampants inſtead of Truſſes.

The ſecond thing to be obſerv'd is not to unfold ſo much of the Roller.

The third is to hinder the Truſs, that is juſt made, from looſening, which is done by leaning the four Fingers of the left Hand upon the laſt part of the Band that is underneath, and bringing the Thumb forwards to direct it.

The fourth is to reverſe the Head of the Band, the upper ſide under, the Part that is roll'd hindmoſt, and the Part unroll'd foremoſt, to fold the Band above, ſo as that the upper edge of the Roller may be undermoſt, and that which was on the inſide may be on the outſide.

The fifth is not to draw the Head of the Band till the fold or or Reverſe be ended.

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The ſixth is to obſerve, in drawing the Band ſoftly downwards, to unroll as much as neceſſary to finiſh the turn, and to hold the right Hand in this Place till the left has taken the Roll of the Band, as has been ſaid above.

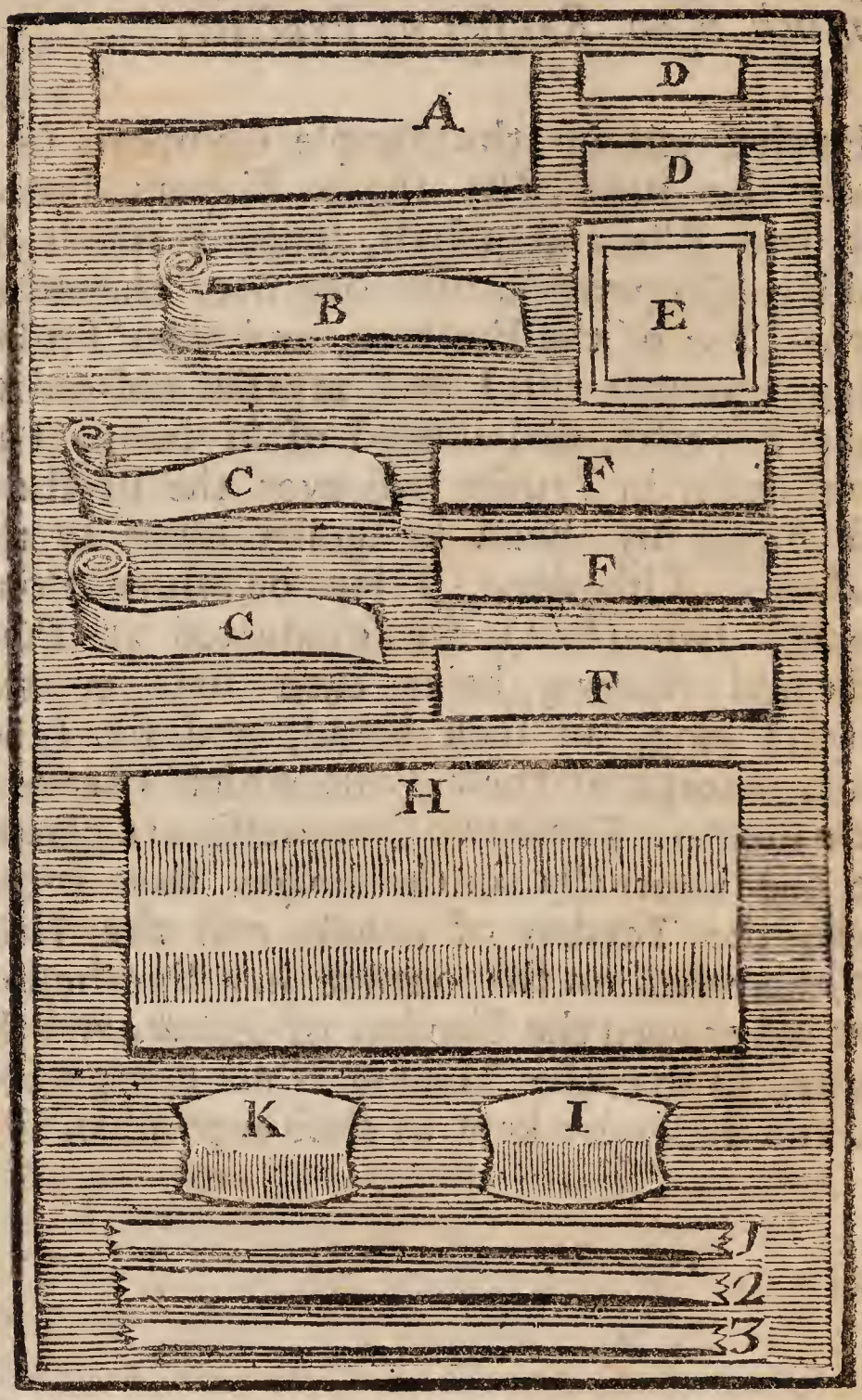
7°. The right Hand, on parting with the Roll, muſt paſs lightly, from the inſide to the Part underneath over the Reverſe juſt made to ſmooth it and make it equal, following the Roll which is carry'd by the left Hand from below upwards, and drawing the Band lightly at the very inſtant that it is unroll'd to make the ſecond Reverſe.

This firſt Reverſe being finiſh'd they make a ſecond, then a third, a fourth, or more if requiſite, and all going upwards toward the Knee, obſerving two things, firſt to raiſe the Band at every Reverſe and Truſs, at the time that the left Hand carries it under, that is to ſay, that one caſt of the Band muſt not be made upon another, becauſe the Bandage muſt terminate going upwards, and every turn muſt be higher than that which went before it; and for this they take the time that the Band goes under the Leg, and trims the External Part; which they regulate by the diſtance they put between each Reverſe. If this Circumſtance be not obſerved the Band that comes to the outſide of the Leg would be lower than the Reverſe juſt made. The ſecond thing to be obſery'd is to place the Plaits of the Reverſe ſo as that they may meet in the ſame Line going upwards, which gives them exactly the ſhape of an Ear of Corn. When there is no longer need of the Reverſes, they make circular Caſts going always upwards to finiſh the Bandage near the Knee.

This is a Method wherein I have had good Succeſs, and which is founded as much upon Reaſon as Practice.

Having put on the Simple Compreſs (A), I take the Band (B) three Fingers broad, and two Ells and a half long, I uſe it in making Circumvolutions one over the other at the Place of the Fracture, and then Truſſes going upwards till I find my ſelf obliged to make Reverſes, and inſtead of ſo doing, I go down again in Truſſes paſs over the Fracture, and finiſh my Band by going down to the *Malleoli*: This done, I lay on three Compreſſes, two (DD) are graduated at their ends and fellows, being each four or five Fingers long, an Inch broad, and ſix Lines thick, except at their Ends which I leave a little ſmaller. Theſe two Compreſſes are placed, the one internally in the hollow that is between the Tendon of *Achilles* and the *Tibia*, and the other on the outſide in a like hollow that is between the Tendon of *Achilles* and the *Perona*, ſo that the Tendon is not compreſs'd, and the Bones are kept as cloſe as poſſible.

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The third Compress (E) is a little more than five Fingers square; it is six Lines thick, except half a Fingers breadth on every side where it is graduated, and not so thick by half. I lay this third Compress from the small of the Heel to the Small of the Calf, so that its middle encompasses the former two little Compresses, which I call'd twins. This done, I take the second Band (C) to make fast the whole, beginning near the Heel, then going up to the Fracture, over which I make three rounds, before I go higher to finish my Band. After this I lay on the longitudinal Bolsters (FFF), then the third Band which fastens them on, and after that the Past-boards, Junks, and the rest that are going to be describ'd.

In the following Method of Reverses, one ought after the first Band (*B*) to put on the second (*C*), which must make three turns upon the fractur'd Part, then go down in Trusses to the *Malleolus Externus*, which it must cover, passing obliquely over the Instep, to cross the Sole of the Foot, and coming back obliquely upwards, to make a St. *Andrew*'s Cross with the first oblique turn, then covering the *Malleolus internus*, returning back to the Leg, going upwards in Trusses passing over the Fracture, and thence to the Calf of the Leg, where it forms Reverses if need be to end in Trusses, near the Knee like the first Band.

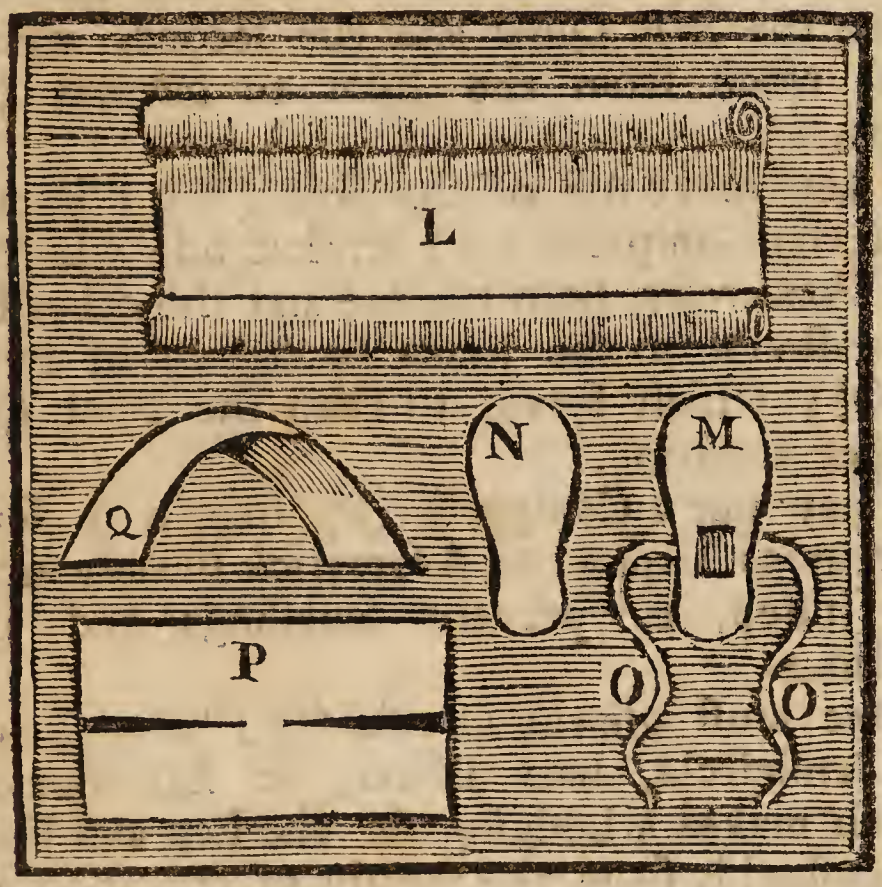
When this second Roller is put on, they place the graduated Compresses (H) which are thicker from the Heel to the Calf than they are beyond it. I content my self with having proposed the Method that seems to me the best, without pretending to show the Defect of graduated Compresses; practising will determine

determine you of your ſelf to chooſe the beſt. I ſhall conclude by adding that they faſten on this graduated Compreſs with Pins, and afterwards put on three longitudinal Bolſters 12 or 13 Inches long, an Inch and half broad for great ſubjects, and leſs in proportion for ſmall ones; and as to their thickneſs 'tis different. That which is laid from the Small of the Heel to within two or three Fingers breadth of the Ham, is very thick below, and ſlender at the Top; another which is laid along the inſide of the *Tibia*, is two Lines thick all along; the third, which is laid on the outſide, is a little thicker than at the Top. Theſe three Compreſſes being thus put on, are held above and below by the two Aſſiſtants, and then made faſt with the third Roller (C), which is longer than the others. They begin to apply it below, at the edge of the three longitudinal Bolſters, over which they make three Caſts to fix the end of the Band, then they go upwards in Truſſes, which form Circles to the upper End of the longitudinal Bolſters.

Then they clap on the Paſt-boards (I K) which are an Inch ſhorter then the Bolſters, and ſufficiently large to encompaſs the whole Leg within a Finger's breadth both before and behind; they are cut a little ſloping at the bottom and top, and are put one on the inſide, and the other outwards; they are faſten'd with three Ribbands, 1, 2, 3; which go twice round, and are ty'd on the outſide of the Leg, in a Knot and a Roſe: They begin by tying the middle Strap, and then the other two.

The Leg being thus made ready, they place it in the Junks (L), which are made with a handful of long Straw, and bound in the

the ſhape of a Fagot, or twiſted about with Fillets or Packthread: They cut them of a proper length, to take up from the bottom of the Foot to above the Knee, and they wrap them in a Napkin which they roll over the two Ends.



Theſe Junks muſt be long enough to encompaſs the Joints above and below the fractured Bone: The ſides of the Leg muſt be trimm'd in the hollow places, and thoſe whereon the Junks muſt reſt, with little Compreſſes or ſmall Cuſhions. The Junks muſt be bound on with Straps, wherein what we mention'd in tying on the Paſt-boards muſt be obſerv'd. The fore-part of the Leg, over which the Straps of the Junks go, muſt be trimm'd with a thick Compreſs to ſecure the Tegument that covers the Creſt of the *Tibia*.

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The Leg being in the Junks, the Pillow whereon 'tis placed muſt be even, and ſoft, and laid upon a Quilt, which muſt it ſelf be very even; and to preſerve both the one and the other in this evenneſs and ſteadineſs, the Bed muſt only be of Quilts without a Feather-Bed, and there muſt be a Plank laid between the firſt Quilt and the ſecond, which muſt reach from the Foot to beyond the Hips.

They make uſe of the Sole (M), trimmed with the Compreſs (N) on that ſide whereon the Foot reſts, both the one and the other being faſten'd to the Junks by a ſort of Strap (O O); which ſerves to keep the Foot in a proper ſituation.

They put a Compreſs (P) ſteep'd in ſome Spirituous Liquor, as Aromatick Brandy upon the Inſtep, to prevent Swellings and Defluctions.

One muſt uſe the Cradle (Q) being a ſort of Semicircle, half Drum, or half Bucket, which makes a Lodging for the Leg and Foot, to defend it from the weight of the Sheet and Bedcloaths, and under which there is room enough to ſupply the Leg and Foot with Napkins, and other hot Cloths, which they warm from time to time when the Foot is cold.

As to its poſition, the Leg muſt be raiſed towards the Foot, becauſe this Poſture favours the return of the Blood and the *Lympha*. It muſt lye ſoft to prevent Pain, and ſteady, becauſe Motion would diſplace the Bones, and prevent the formation of the *Callus*.

The Patient muſt lye in a right Line upon his Back, with his Head moderately rais'd for his Convenience, but not too much, for

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fear the Weight of the Body ſhould draw him down to the Foot of the Bed.

They have a board cut as broad as the Foot of the Bed, which they faſten to the Bed-poſts, with Pegs or Nails the ſame way as the Head-board.

Againſt this Board they faſten a Billet four or five Inches thick, and trim it with Napkins, which makes it yet larger for the convenience of the Patient, who makes uſe of it from Time to Time, to raiſe his whole Body towards the Bed's Head, or only to reſiſt the Tendency which the Body has to ſlide towards the Feet of the Bed. He muſt not make uſe of this Billet till ſuch time as all Accidents are over.

There muſt alſo be a Cord hanging at the Teſter of the Bed, or at the Cieling if the Teſter is not firm enough, which helps the Patient to move himſelf for his neceſſary Occaſions.

Being thus placed, they Bleed him ſome time after, or even upon the ſpot, in caſe of Neceſſity, they repeat the bleeding, make him obſerve a Regimen, keep him very warm in Winter, and alleviate the exceſſive heats of the Summer; ſee the general Cure of Fractures.

CHAP. XIV.

Of the Complicated Fracture of the Leg.

AFTER what I have ſaid of Complicated Fractures in my Account of Fractures, in general, or in that of the Thigh in particular, I might be excuſed from ſpeaking of the Leg; but one can't treat too amply of a ſubject ſo uſeful, all the Caſes whereof can never be foreſeen. However, I hope that either in this Chapter or the others there will be enough to prevent any one's being a Novice in the Cure of the Complicated Fractures that may befal the other Parts of the Body.

'Tis known that three Things render a Fracture Complicated, *viz.* the Diſeaſes, the Cauſes, and the Symptoms.

The Diſeaſes are Diſlocations, Impoſthumes, Ulcers, and Wounds. We have treated ſufficiently of Luxations with Fracture, in the general Account of Luxations, and of Fractures with Wounds, in that of the Thigh, therefore I go on to Fractures with Ulcers; and to the end that what I ſay may make greater impreſſion on the Reader, I will cite two Caſes upon this Head that are very different.

In the one, the Bones were laid open with a *Caries* and Fracture, and in the other there was a Fracture without any other alteration in the Bone, but there was an Ulcer at the

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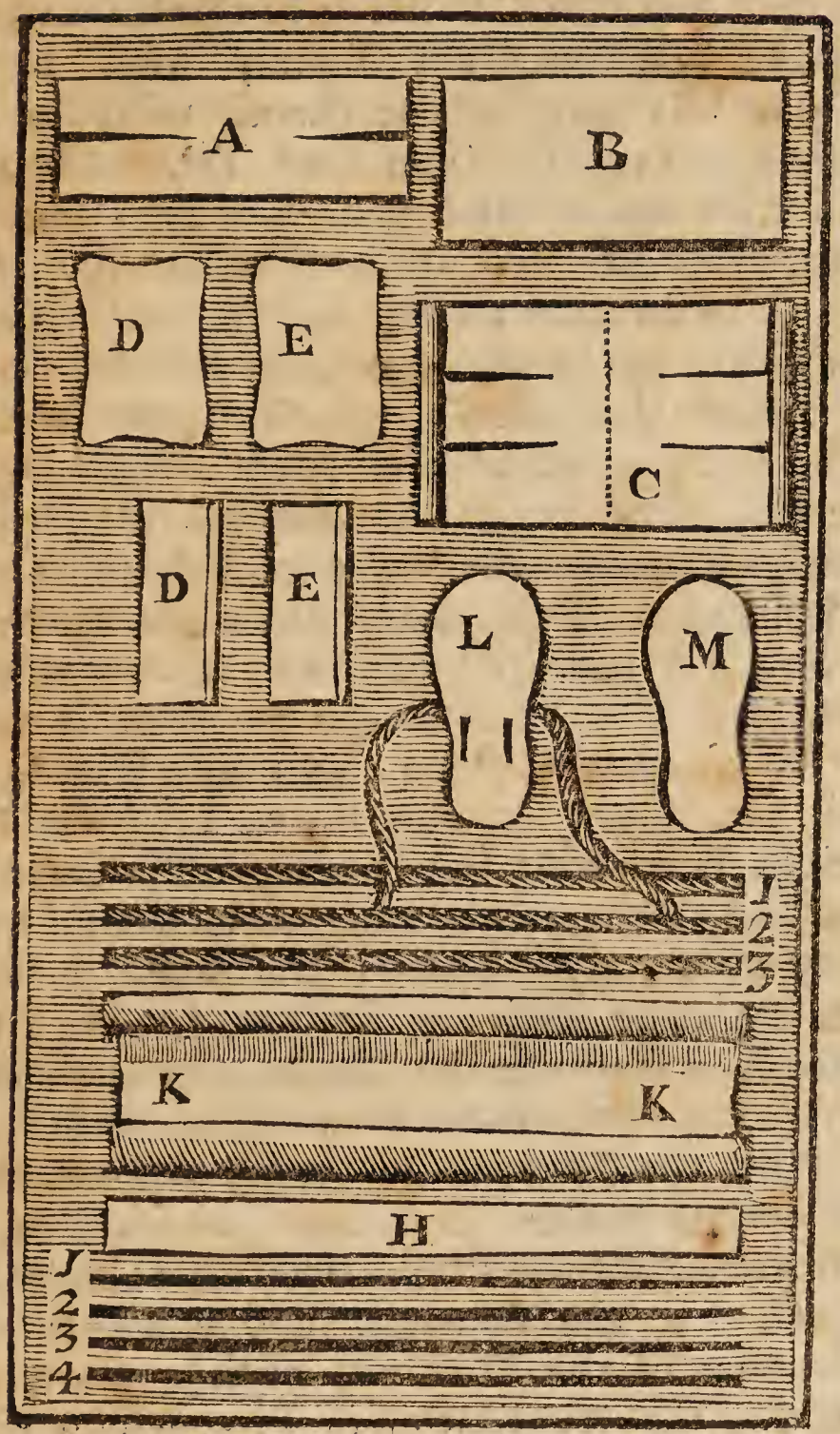
ſame place where the Fracture was, without the Bones being bare.

The firſt was a Youth between 18 and 20 Years Old, who had an Ulcer with a *Caries* in the middle of the *Tibia*, which had been neglected for ſeveral Years. It happen'd by chance that a Cart-Wheel ran over his Leg, and fractured that Part where the *Caries* was. The Wheel had no great difficulty to uncover the Bone, which was only cover'd with proud and Spongious Fleſh: The *Perona* was whole, and perhaps the *Tibia* had not been broken but for the *Caries*, which had affected almoſt half its thickneſs. In this condition he was brought into the Hoſpital at *Courtray*, where I was then firſt Aſſiſtant. Having diſcovered the Diſeaſe to be as I have deſcrib'd it, I placed the fractured Part upon a little Quilt of the length of the Leg, during the Time that I prepared my Dreſſings. I placed upon the Junks (KK) all the Pieces neceſſary according to the order in which they were to be apply'd; after which I dreſs'd the Wound.

I cut all the unſound fleſh into looſe Pieces, and even thoſe which ſtill adhered to the putrify'd Bones. There was no need of any Extenſion, becauſe the *Perona* was entire, which had prevented the Bones getting one upon t'other; the lower Part only went beyond the other two Lines, I re-united it by thruſting it with the Thumb of one Hand, and raiſing the Foot with the other; I dreſs'd all the Wound with dry Lint, and having wiped away the Blood that was about it, I put under the Leg the Junks, whereon all my Dreſſing was, which conſiſted of the Simple Compreſs (A) cut at both Ends, with which I cover'd the Wound, turning back the four

Ends of the Compreſs one after another; after this I cover'd it with a thicker Compreſs (B) which ſerves uſually to prevent the reſt of the Bandages being ſpoil'd, becauſe it ſoaks up the Matter that flows from the Wounds or Ulcers. After this I put on the Bandage with 18 Tails (C) beginning at the Middle, then at the Bottom and Top, faſtening always the Ends of the Band with thoſe that follow'd. When I had placed ſix Tails on each Side, I put two Compreſſes (DE) all along the Leg, one within and the other on the outſide, to ſerve as Splints, which were made faſt by the ſix laſt Tails of the Bandage. Over all this I bound with the Straps, 1, 2, 3; the two Paſtboards (DE) which encompaſs'd the Leg: I placed the thick Compreſs (H) four Fingers broad, and as long as the Junks, upon the fore-part of the Thigh, the Leg, and the Foot; this Compreſs ſerves to prevent the Straps of the Junks from hurting; and afterwards I ty'd the Junks with four Straps 1, 2, 3, 4; at equal diſtances from the *Malleoli* to four Fingers above the Knee, taking Care, above all, not to let the Straps paſs over the Place where the Wound or Ulcer was, becauſe it wou'd be very detrimental. The Foot muſt be ſupported by the Sole (L) trimm'd with the Compreſs (M) ſteep'd as uſual. One muſt make uſe of falſe Junks as has been propoſed in the Complicated Fracture of the Thigh; or if, inſtead of all theſe Junks both true and falſe, one chooſes a Caſe, I have contriv'd a new one, the Uſe and Deſcription whereof you will find at the end of this Chapter.

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I dreſs'd this Fracture thus for ſeveral Days, without taking any Care of the Radical Cure of the *Caries*, becauſe the Patient had the Fever; but as ſoon as this Accident ceas'd, I apply'd the actual Cautery to the Ends of the broken and putrify'd Bones, after having taken away part of the *Caries*, with the Exfoliative Trepan. The next Day I apply'd the Fire again, and I dreſs'd it afterwards with Pledgits ſteep'd in Tincture of *Aloes*, which I laid upon the Bone, uſing at the beginning only a ſimple digeſtive for the Fleſh, and after that the brown Ointment to prevent the growth of the Fleſh which is very hurtful. I follow'd this Method till the Bone was exfoliated, which was 50 Days after the Application of the Fire; then I let the Fleſh grow, and procured the Scar after the uſual manner.

As to the Fracture with an Ulcer, but without *Caries*, or the Bones being bare, it might be dreſs'd like a Simple Fracture but for the Ulcer, which being to be dreſs'd every Day abſolutely requires the making uſe of the Bandage with 18 Tails, till it be cured; then one may uſe the Bandage of the Simple Fracture, if the *Callus* be not yet form'd.

As to the Fracture with a Wound where the Bones are broken in pieces and laid open, one muſt take all the Precautions that have been given for the Bandage, and even for the Dreſſing of the Fracture, with a *Caries*, excepting the Application of Fire, which at the moſt can only be proper at the End, I mean when the Exfoliation is ſlow and difficult, and even then it muſt be done with Circumſpection.

If any Pieces of the Bone are found to be entirely ſeparated, they muſt be drawn out, and in their room muſt be placed ſuch as ſtill adhere to the Fleſh, becauſe they may cloſe again, if not, they fall off with the Suppuration; nevertheleſs if theſe Splinters, or even the Ends of the Bones ſhou'd be ſo ſharp, as that they may hurt the Veſſels, the Muſcles or the Tendons, they muſt be cut off with a Chiſel, Inciſive Pinchers, or other Inſtruments which the Surgeon ſhall think proper.

If there ſhould be a *Hæmorrhage*, the Blood muſt be ſtanch'd by the Ligature, the Button, other Stypticks, or Compreſſion.

By the Ligature, if the Surgeon ſees the Veſſel, and can run the crooked Needle threaded thro' eaſily, without hurting any Nerve or Tendon.

By the Button, when the Veſſel is very large, and a way can't be found to make uſe of the Ligature.

By the other Stypticks if the Veſſel is ſmall.

By Compreſſion when it is not poſſible to make a Ligature, and the Application of the Button or other Stypticks ſhall be judged pernicious to the neighbouring Parts, whereon the Vitriol might make ſome ill impreſſions.

If there be any Extraneous Body, as Stones, Balls, Pieces of Boot, of Stockings, *&c.* they muſt be drawn out obſerving all the rules of the Operation of the *Exæreſis*; then one muſt bring the Shreds of the Wound near each other, if there are any, and afterwards bind the Part, and give it a right ſituation as has been already ſaid.

A Fracture with a Wound made by a cutting Inſtrument is to be differently managed; one muſt immediately bring the Lips of the

Wound together by an uniting Bandage, if it be long; and if it be very oblique or transverse, one must make the Suture; they use the Bandage with 18 Tails, till the entire Reunion of the Wound.

This Method succeeds, provided the subject be good, and observes an exact Regimen, at least I have seen it have success in an Arm almost cut off by the stroke of a Sabre, and even in the Jaw, where there was a Wound with the Flesh dilacerated.

I have seen in Fractures with Wounds in the Arm, the Fore-Arm, the Jaw, and the Leg, a sort of Cuiras's us'd with good success, being moulded to the Part, and trimm'd with a Compress, and having a little Wicket join'd by a Hinge or two, made in it, which shuts with a Hook, and opens at the place where Wound is, that it may be dress'd: Tho' I have seen it us'd for the Leg, and the Fore-Arm, it has not had the same success; it suits much better with the Arm, and Jaw, because one may place the Fore-Arm and the Leg conveniently upon Pillows, and fix them so that one may dress them conveniently without displacing the Bones, whereas it is not the same with the Jaw, and the Arm, where it is pretty Difficult to keep the Bones in the Condition wherein they are placed. *Sculletus* furnishes us with something like it in his Magazine of Surgery, to which I refer you.

A Deſcription of a Caſe of a New Invention, for the Dreſſing of Complicated Fractures of the Leg.

THERE are three Things abſolutely neceſſary for the perfect re-uniting of broken Bones.

1°. The Bones muſt be ſo join'd and brought together, that they may touch exactly throughout their whole Surface.

2°. Both ends ought reciprocally to ſweat out or diſtill a nutritive Juice which has all the Qualities requiſite to agglutinate, join, and ſolder the Bones together.

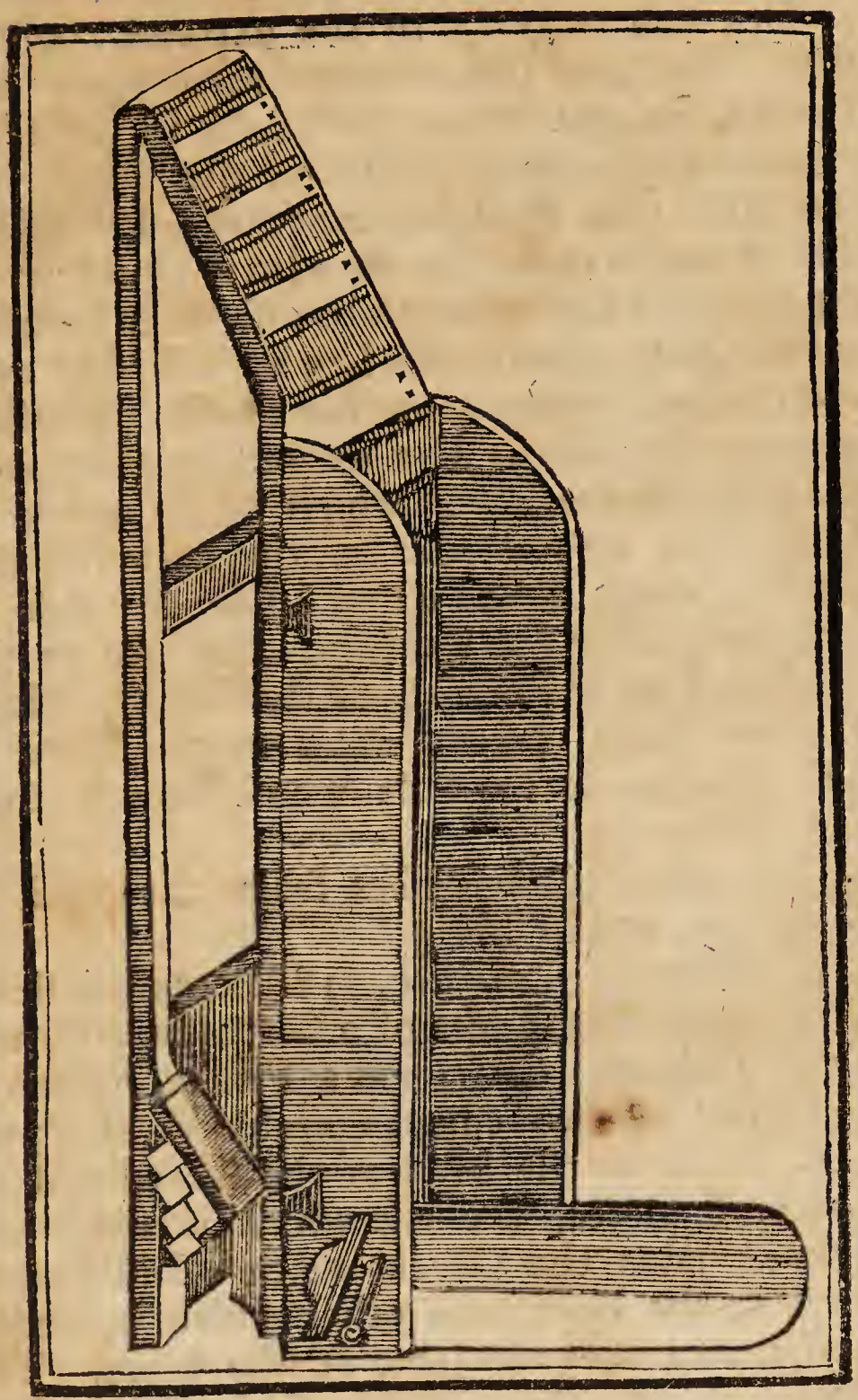
3°. During the 30 or 40 Days, more or leſs, that the Re-union of the Bones is perfecting, they muſt be kept ſtill, to the end that the Cement which is made by the Nutritive Juice, may not be interrupted in its Agglutination, by Motions that would deſtroy in one Minute the Work of ſeveral Days. To compaſs this laſt End, the Fractures muſt be dreſs'd as ſeldom as poſſible, the Bandage muſt be neither too tight, nor too looſe; the Patient's Body muſt be placed commodiouſly, the wounded Part a little rais'd, to facilitate the return of the Fluids: It muſt alſo lie ſoft, that all may induce the Part and the Patient to obſerve that Reſt which is ſo neceſſary for his Cure.

This Machine which I have preſented to the Academy, is of great uſe in procuring all theſe Advantages, but before I deſcribe it, I believe it will be better to give an Account of thoſe that have been us'd till now, that the advantages

advantages of this may be the better perceiv'd.

I ſhall take no notice of the Caſes or Junks that are proper for Simple Fractures, becauſe it is eaſier to contain them; 'tis not the ſame with Complicated ones, for which they have made uſe of the Bark of Trees, Junks, falſe Junks, and a Caſe; ſucceſs has made them preſer this laſt Method to the others, therefore I ſhall only ſpeak of the Caſe, the rather becauſe the Machine that I offer is it ſelf a Caſe in perfection

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The Common Caſe is compoſed of four Pieces, *viz.* a Sole, a Floor, and two Walls.

The Sole is join'd to the extremity of the Floor by two Hinges that turn upon two Hooks, and the Walls are join'd in the ſame manner to the lateral Parts of the Floor, for the Uſes that ſhall be mention'd hereafter: The Floor is cover'd with a little Quilt which ſupports the Leg; the Walls alſo being trimm'd with a Quilt contain the Leg by drawing near each other, and prevent the Motions it might make on the Sides. The quilted Sole ſupports the Sole of the Foot, which by its means is kept more or leſs bent by the help of two Hooks, which faſten on each ſide the Sole in two Irons like Pot-Hangers, that are at the End, and on the outſide of the Walls, which Hangers have ſeveral Holes to give more or leſs elevation to the Sole whoſe Hooks they receive.

The New Caſe differs from the Old in Structure, and in uſe.

It differs in Structure, 1°. Becauſe inſtead of a Floor it has a ſort of a Girth-Bed, form'd by a Ticking nail'd upon a Frame, which is compoſed of two Cheeks arch'd at the part that comes to the bend of the Knee, and of two croſs-pieces, the one which is ſtrait and ſhorteſt joins the Cheeks at the End that is towards the Foot; the other which is longeſt and arch'd does the ſame at the Knee. The ſecond thing, wherein this Caſe differs from the firſt, is a frame compoſed alſo of two Cheeks and two Croſs-pieces, the whole parallel to the upper Frame, excepting that the Cheeks of this latter are quite ſtrait, and thoſe of the upper one are arch'd. The Cheeks both of the one and the other Frame

are

are join'd together, at the end that is towards the Thigh by two Hinges, which gives liberty to ſeparate or bring them near more or leſs; and to keep them at a proper Diſtance. There is a ſort of Pallet jointed by two Wooden Hinges, that hang upon two Hooks faſten'd to the ends of the Cheeks of the upper Frame; which Pallet falls againſt the Cheeks, and may be rais'd by degrees that are mark'd by Notches cut for that purpoſe, in the upper part of the Cheeks of the under Frame, towards the Foot, ſo that one may raiſe or let down, the upper Frame whereon the Leg lies, more or leſs, for the Uſes we are going to mention.

This Caſe differs from the other, in that with the ſame advantages, it has an infinite number of others more eſſential, without any of its defects.

1°. By reaſon of the double Frame, the Leg may be raiſed more or leſs for the Satisfaction of the Patient, who finds relief when his Leg is rais'd, or let down, not being able without Pain to continue long either in the one Poſture or the other; and one may change it without fear of the Bones diſplacing, becauſe the alteration depends only upon the Flexion or Extenſion of the Knee, which Motions may be made by the means of the upper Frame, without running the Riſque of diſplacing the Bones.

2°. The Pallet having degrees of reſting, upon the Cheeks of the under Frame, may raiſe the Leg ſafely to any degree that is convenient for the Patient in his Dreſſings, or in the Intervals.

3°. As Complicated Fractures ought to be dreſs'd every Day once or twice, and as at each

each Dreſſing one muſt raiſe and let down the Leg, that theſe Motions may not be prejudicial to the Formation of the *Callus*. It is obſervable that one may raiſe the upper Frame, and conſequently the Leg, till the Pallet be at its higheſt degree of Elevation, then have the Leg held by two of the Surgeon's Men, and bow down the upper Frame to draw it from beneath the Leg, and give to an Aſſiſtant who muſt clean it, and trim it with a new Bandage, after which it muſt be replaced under the Leg at a height proper to receive it; by this means avoiding the Hazard one may run by having two Perſons not equally Strong nor Skilful, either to raiſe or let down the Leg.

4°. The Ticking that is in the upper Frame makes a ſort of Girth-Bed, whereupon the Leg is much more commodiouſly ſituated than on the Floor of the old Caſe; the Calf of the Leg and the Heel form themſelves a lodging therein, and the whole Leg ſeems to adapt it ſelf to it.

5°. The Arch of the Cheeks of the upper Frame, which is at the bending of the Knee, is very uſeful, by reaſon it gives liberty to the Leg to bend, which contributes not a little to the preventing of that intollerable Pain which almoſt all feel, whoſe Legs are put in the ordinary Caſe; the rather becauſe the principal Cauſe of this Pain proceeds from the Tenſion of the Tendon of *Achilles*, which one relaxes by bending the Leg, becauſe the two Muſcles *Gemelli* which compoſe it with the *Soleus*, take their Origine from the Condyles of the *Femur*, and paſs by the Articulation of the Knee.

6°. The

6°. The lower Frame receives in its ſquare the ſwagging of the Quilt preſs'd by the weight of the Leg, which retains the Caſe and hinders it from ſliding down towards the Feet of the Bed, an advantage which the common Caſe has not.

CHAP. XV.

Of the Rupture of the Tendons that are inſerted at the Heel, and are call'd the Tendons of Achilles.

THE being convinced of a Fact, or the doubting of it, is not always what induces Perſons to grant or denying it. 'Tis the weakneſs of certain Men, that ſelf Love determines them more than the Truth; an Abſurdity is granted upon a ſingle Relation, and the Truth (even when demonſtrated) is call'd in Queſtion.

Who can believe, ſays one of theſe Weak—— Who can believe that the Tendons can break with a Strain? Their Structure alone convinces me that 'tis impoſſible. Beſides *D*—— who has ſeen the pretended Rupture which they quote for an Example, ſays that the Allegation is falſe.

When this Man ſpeaks thus do you believe he gives credit to what *D*—— ſays? No, he knows him too well. Nevertheleſs this Witneſs tho' falſe, tho' weak, is ſufficient to determine him to take that part that flatters his ſelf Love, becauſe he

he thinks to injure my Reputation; but he is miſtaken, having no other object but the Truth, I deſpiſe his Flings, and I dare (for any thing that regards him) believe my ſelf invulnerable even in the Tendon of *Achilles*.

Experience which I take for a Guide, and which is ſo to all who ſearch after truth, has let me ſee ſeveral Times that the Tendons were apt to break. I have given ſome Memorandums upon this ſubject to the Academy of Sciences; what I ſhall ſay here is but an Extract, but 'twill be ſufficient for young Surgeons, for whoſe Benefit I write this Treatiſe.

It ſeems difficult for a ſtrain only to break the Tendons of *Achilles*; 'tis nevertheleſs what I have ſeen, and ſhown to ſeveral of my Brethren.

The *Sieur Cochoix*, one of the moſt active Leapers in his Troop, broke the two Tendons of *Achilles*, in a Leap he took with his Feet cloſe, upon a Table three Foot and a half high, without making any External Wound. This Rupture happen'd ſo, that the Muſcles of the Calf of the Leg carried away on their ſide the greateſt part of the Tendons, and the Heels retain'd the reſt. The Part which remain'd at the right Heel was above two Inches long, and that which kept at the Left but 12 or 13 Lines. The broken Ends were ſo far diſtant from each other, that one might find under the Skin room enough to put three Fingers in the ſpace that was left between them. I dreſs'd this Wound till I brought it to a perfect Cure, and the Caſe ſeem'd to me ſo ſingular, that I thought I ought to communicate it the Publick.

What I have to ſay upon this Head is reducible to three Things, *viz.* how this Rupture

ture was made; how Art and Nature conſpired to cure it, and laſtly the Explication of three ſingular *Phænomenas* that were obſerv'd therein.

That one may comprehend how this Rupture cou'd be made, it muſt be obſerved, firſt that in our natural State, when we ſtand exactly upright, the Line of Gravity paſſes thro' the middle of the Bones of the Thigh, Leg, and Foot: Theſe Bones at that time mutually ſupport each other, as do the Stones in a Column, and our Muſcles hardly act at all. On the contrary they act very much to ſuſtain our Bodies when our Joints are bent, and their Contractions are ſo much the ſtronger as the Flexion of the Joints is greater; and they may be even bent to ſuch a pitch that the weight of the Body, and the Muſcles that keep it in an *Equilibrium*, will make an Effort upon the Bone the utmoſt of their Power; then the *Apophyſes* where the Muſcles are inſerted may be broken if the Muſcles reſiſt; but if the *Apophyſes* of the Bones are ſtrongeſt, the Rupture will be in Muſcles or the Tendons.

All the World knows that the Bone of the Knee will break by a ſtrain: By a like Cauſe I have ſeen the Tendons of the *Extenſores Recti* of the Knee broken. Mr. *Poncelet* my Brother Member, a famous Surgeon, cured a Man who in a falſe ſtep broke the Bone of his Heel by the ſole Retraction of the Tendon *Achilles*.

If the Muſcles, the Tendons, and even the Bones may be broken by Cauſes ſo ſlight to all appearance, without doubt they wou'd ſcarcely be able to reſiſt, when the Muſcles are oblig'd to act not only to bear up againſt the

weight of the Body, but even to raiſe it with Strength, carry it off the Ground and ſhoot it into the Air, as Leapers do when they jump with their Feet together upon the edge of a Table.

In leaping thus they bend their Head and their Body upon their Thighs, their Thighs upon their Legs, and their Legs upon their Feet, then in an inſtant relaxing all the Muſcles, as if to take their Spring, they put them into that ſudden Contraction which makes a Rebound againſt the Earth, whence they ſhoot themſelves into the Air, and ſtraiten on coming upon the Table.

Altho' this ſtrain ſeems ſufficient to break the Tendon of *Achilles*, and ſeveral Leapers have hurt themſelves in taking ſuch Springs, that of the *Sieur Cochoix* was much greater, the Table whereon he leap'd was too high, his Spring did not raiſe him enough, and only the Ends of his Feet touch'd the Edge of the Table, where they reſted but long enough to ſtraiten themſelves, and break their Determination forwards; the Line of gravity not falling upon the Table, the Leaper came to the Ground directly upon his Tiptoes, extended in ſuch a manner that the Tendons of *Achilles* were, if I may ſo ſay, ſurpriz'd in their ſtrongeſt degree of Tenſion, and the fall of above three Foot added to the weight, a force more than ſufficient to break them, ſince it was what the weight of the Body had acquir'd, multiply'd by the ſwiftneſs of the Fall.

Art and Nature labour'd in Conjunction to effect the Re-union of theſe broken Tendons.

Art

Art was abſolutely neceſſary thereunto, whether it were to bring together their ſeparated Ends, or to keep them, when brought together, whilſt Nature was at work for their Re-union.

To perform the firſt Operation, I laid the Patient upon his Back, bent his Ham, thruſt the Calf of his Leg towards the Heel, and brought his Heel towards the Calf, by extending the Foot till the two Ends of the broken Tendon touch'd each other. Whilſt the Parts were held in this Poſture, I ſteep'd a double Compreſs in Brandy, with which I encompaſs'd the wounded Part; and I put another call'd longitudinal, which was thicker than the firſt, two Inches broad, and two Foot and half long behind, from the Ham to beyond the Toes, covering the Calf of the Leg, the Heel, and the Sole of the Foot. To faſten this Compreſs, I took, whilſt they held it thus, a Fillet four Ells long and two Fingers broad, with which I made four rounds about the place where the Rupture was, in which rounds I made faſt the middle of the Longitudinal Compreſs; then carrying the Fillet obliquely from without inwards over the Foot, I brought it a-croſs under the Sole; I faſten'd the Longitudinal Compreſs again in this Place, and coming back from within outwards obliquely over the Inſtep, making a St. *Andrew*'s Croſs with the firſt oblique turn, I carry'd the Fillet over the Ankles where I made a circular Caſt, and whence I came back obliquely from without inwards over the Foot, under the Sole, and then again upwards to make a ſecond Time a St. *Andrew*'s Croſs, and a Circular Caſt over the Ankles. Having repeated theſe ſame Cir-

cumvolutions four Times, and the Fillet being come to the Ankles, instead of going again downwards towards the Foot, I went upwards in Circles to the Calf of the Leg, where I had what remain'd of the Bandage held, that I might with both Hands reverse the two Ends of the Compress that were not yet made fast. The End at the Ham was revers'd towards the Heel, and that at the Sole of the Foot was turn'd back towards the Leg, I fasten'd them with Pins, and with the rest of the Fillet which I pass'd several times over them at different Parts of the Leg and Foot. These two Ends of the Longitudinal Compress being thus fasten'd and revers'd the contrary way one to the other, kept the Foot in its last degree of Extension, so that the Ends of the Tendons were not only brought near, but touch'd and mutualy thrust against each other.

Having apply'd this Bandage to one of the Feet, I did the same to the other; then I placed a Pillow under the Hams to keep them bent, relax the *Gemelli*, which by their Contraction might have drawn the upper Part of the broken Tendon upwards. I steep'd the dressings of both the one and the other in Brandy, and I order'd them to be moisten'd afresh every four Hours, I bled the Patient that very Evening, and twice next Day, and prescrib'd him a Regimen.

Eight Days afterwards I took off the Dressing, and found the Parts favourably dispos'd towards a Cure, at the Fifteenth I took it off again, and the dispositions seeming yet more favourable, I did not at all doubt of his Recovery: The Twenty second, some slight motions that I made in Dressing him confirm'd

me

me that the Re-union was made; and the Thirty ſecond Day, I found him by the Fire, whether he had made himſelf be carry'd, and he told me that he believ'd he cou'd perform his ordinary Exerciſes.

'Tis not to be doubted that Art had a great ſhare in this Cure, but without the help of Nature all my precautions had been vain: Not contented with finiſhing the Nutritive Juice which ſolder'd the Tendons, ſhe made the Sheaths that cover them ſerve as Moulds; without them the Juices would have ſpread in the neighbourhood, the Scar would have been too weak, and the Tendons wou'd have contracted an adherence with the Parts adjacent, which would have depriv'd them of that facility of Slipping, which renders them ſo proper for motion.

I ſhall finiſh this Obſervation with explaining three *Phænomenon*'s that are very ſingular; the firſt is that the Patient extended and bent his Leg the inſtant after the Rupture of his Tendons, the ſecond is that he cou'd not ſtand, the third that he felt no manner of Pain on the breaking his Tendons, nor indeed afterwards during the whole Cure.

He cou'd bend his Foot becauſe the Muſcles *Flexores* were not hurt, and he cou'd ſtretch it out, altho' the Tendon of *Achilles* was broken, becauſe the *Tibiæus & Peronæus Poſticus* which were not rent, are ſufficient to make the Extenſion, as I have experienced in a *Cadaver* after having cut off this Tendon of *Achilles*.

The Patient cou'd not ſtand, becauſe, altho' the *Tibiæus & Peronæus Poſticus* were ſufficient to extend the Foot, the Point, by which theſe Muſcles paſs from the Leg to the Foot, is too near the *Fulcrum*.

This Obſervation ſhews that the Diſtance of the Tendon of *Achilles* cauſes all the ſtrength of the Foot, and 'tis ſeen, that the more this Tendon is diſtant from the Articulation, the more force it has. The Animals that run and and leap with the moſt agility are thoſe in whom this Tendon is at the greateſt Diſtance; Men whoſe Heel is very long are the leaſt wearied with walking, and the longer the Foot is, the more neceſſary is the length of the Heel.

If the Tendons of *Achilles* were rent without Pain, I don't believe that the Senſation was deſtroy'd by the premeditated Action of the Leaper; it ſeems to me that it proceeded from the velocity of the Motion which broke them totally, and at the ſame Inſtant.

In ſpite of all the Care I have taken to give exactly the Truth of this Obſervation, there have been incredulous Perſons, whom I cou'd willingly forgive, if I were ſure of the Integrity of their Intentions. I know that People may invent Lies, and that all Novelties may be ſuſpected as ſuch, but it is not leſs impudent to deny, than to ſubſcribe to them without examination, and when one has eſpouſed any ſide one is obliged to tell the Reaſons that have induced one to it.

If thoſe who have declared againſt my Obſervation upon the Rupture of the Tendons of *Achilles*, had communicated their Reaſons to me, I wou'd have done my utmoſt to have anſwer'd them; but they have ſpared me that Trouble, by contenting themſelves with ſaying obſtinately that the Tendons cannot break. Altho' this manner of attacking me be very advantagious to me, the Truth or Falſity of this Obſervation is of ſuch great Importance

to

to the Publick, that I ſhould believe my ſelf as wanting to its Intereſts, and to my own Reputation, if I neglected clearing up this Point.

It may have been obſerv'd in one of the Diſſertations that I preſented upon this Head to the Academy of Sciences, that the Rupture of the Tendons only by a ſham was no new thing: I have alſo remark'd therein that the Bones themſelves, to which the Tendons adhere, are not exempted from fracturing, when the Tendons reſiſt more than they, againſt a Strain that is capable of breaking the one or the other.

I have given an Account how the Lady of the Preſident *de Boiſſiſe*, walking ſoftly in the Court of the *Hotel de Soubiſe*, broke the Bone of her Heel by the ſole retraction of the Tendon of *Achilles*: I have mention'd a like Accident with which Mr. *Poncelet* acquainted me, I have given an Example of *Rotula*'s broken by the ſame Cauſe; I had a Machine made for Mr. *Peron*, (a Maſter Surgeon very expert in Bandages) to ſupply the defect of the Tendon of the *Rectus Extenſor* of the Leg, which a *Dutch* Officer had broken in leaping a Ditch. To theſe Examples I added that of the *Sier Cochoix*, and to that I now ſubjoin two others which have lately happen'd at the Time that I was reading Lectures at St. *Coſmus* upon this Subject.

One of theſe Examples is the Rupture of the Tendon of *Achilles*, which befel a Woman 35 Years old and very luſty. She was going over a Plank that lay a-croſs a Boat, and her Feet ſlipping, ſhe fell, to the bottom of the Boat, full upon the end of her right Foot, which reſted alone upon the Edge of a Croſs-

piece of Timber, (a ſort of Rafter) which they call a Table. The Sole of the Foot, the Heel, and all the left Foot were without ſupport, ſo that (to make uſe of the ſame Terms as in my firſt Obſervation) the Tendon of *Achilles* of the right Foot bore alone all the ſhock, and was (if I may ſo expreſs my ſelf) cruſh'd by the Weight of the whole Body, to which weight the fall, from above ſix Foot high, added a force more than ſufficient to break it, becauſe this force was what the weight of the Body had acquired, multiply'd by the Rapidity of the Fall.

Mr. *Granier*, the Patient's ordinary Surgeon, had me call'd in with ſeveral others of our Brethren; he apply'd the Compreſs and the Bandage deſcrib'd above, and the Patient was cured in as little Time, and as perfectly as the *Sieur Cochoix*.

I have made ſeveral Obſervations upon this Diſeaſe.

Firſt the force that broke the Tendon of this Woman was much greater than that which rent thoſe of the *Sieur Cochoix*, becauſe this Woman is very heavy, fell ſix Foot, and reſted only upon one Foot. *Cochoix* on the contrary is light, fell from a leſs height by half, and both his Feet ſhared in the ſhock of his Fall.

Secondly the Patient felt ſome Pain near the Rupture, and *Cochoix* had none: Neither the one nor the other were ſenſible of any Pain at the Inſtant of the Rupture of their Tendons, and if the Lady felt any near the Rupture, 'twas becauſe on her falling ſhe found nothing to ſtay her ſelf, and *Cochoix* ſav'd himſelf againſt the Table upon which he leap'd, ſo that without this help he had fall'n

a ſecond

a ſecond time which wou'd have caus'd tearings: This is what the Patient cou'd not avoid, which occaſion'd an *Ecchymoſis* by the ſpreading of ſome drops of Blood which the broken Veſſels had let eſcape under the Skin, and in the *Sacculi Adipoſi*.

The third Obſervation that I have made is that Women (the Cauſes being equal) muſt break the Tendon of *Achilles* eaſier then Men; becauſe the Heel of their Shooes being very high keeps that Tendon more ſhortned, and their Feet for this Reaſon are always in Extenſion, which gives the Weight of the Body, multiply'd by the velocity of the Fall, a great deal more power over them than it would have were the Heels of the Shoes lower.

I will ſubjoin to this Obſervation that which I have made upon the Rupture of the tendinous Ligament that faſtens the *Rotula* to the Prominence of the *Tibia*.

The *Sieur Galin*, a Licenced Surgeon, ſent for me to ſee the Son of a Perriwig-maker, in the Street St. *Honore*, over againſt the great Council. This Child, which was Nine Years Old, fell with his Leg bent; the ſole weight of the Body forced the Leg, and carry'd it beyond its utmoſt Degree of Flexion. The Muſcles *Extenſors* were ſo ſtretched that they were in a ſituation to be broken, as well as the *Rotula* or its Ligament. This latter being apparently weaker than the Muſcles or the *Rotula*, broke only becauſe it had not ſtrength to bear up againſt the Weight of the Body.

The Signs that diſcover this Rupture are,

1°. The void ſpace that one feels under the Skin between the end of the *Rotula* and the *Tibia*.

1°. The

2°. The jutting out of the lower Part of the *Rotula*.

3°. The weakneſs of the Extenſion of the Leg, which is only made by the lateral Parts of the *Aponeuroſis* of the *Extenſors*, which paſſes by the ſides of the *Rotula* to inſert it ſelf at the *Tibia*.

This Rupture was without Pain like that of the Tendons of *Achilles*: There was an *Ecchymoſis*, becauſe the Child had an entire Fall, not having any Body near, by which it might ſtay it ſelf.

The Dreſſing was put on with the ſame view as that in the Rupture of the Tendons of *Achilles*; a Compreſs 18 Inches long, and three Fingers broad, reach'd from the middle of the Thigh, paſſing over the Knee towards the middle of the Leg. The croſſing of the Bandage was placed under the Ham, the two circular Caſts faſten'd on the Compreſs, the one above, and the other below the *Rotula*.

After ſeveral rounds of the Bandage had thus faſten'd on this Compreſs, the Ends were turn'd back contrary-ways to each other; that which went up the Thigh was revers'd towards the Leg, and that which was upon the Leg, was turn'd back towards the Thigh; then the unfolding of the reſt of the ſame Band was made uſe of in circular Caſts, to bind on theſe two revers'd Ends of the Compreſs, ſo that the Leg not being able to bend, the two Ends of the broken Ligament might enjoy their mutual Proximity, and Reſt, two things equally neceſſary to procure their Reunion.

CHAP.

CHAP. XVI.

Of the Exoſtoſis, and the Caries.

THESE two Diſeaſes are the moſt fatal that can affect the ſubſtance of the Bones: They have a reſemblance, the one to the Tumours, and the other to the Ulcers that ſeize upon the ſoft Parts; and as the Ulcer follows the Impoſthumes that ſuppurate, the *Caries* is the neceſſary conſequence of the *Exoſtoſes* that ſuppurate: 'Tis for this Reaſon that I comprehend theſe two Diſeaſes in the ſame Chapter.

Definition of the *Exoſtoſis.*

The *Exoſtoſis* is a Tumour that riſes above the natural ſurface of the Bone; it cauſes often very acute Pains, at other Times they are moderate; it is often without any Fever; ſometimes 'tis attended with one that is pretty violent, and proportionable to the Pain: There are ſome that are only accompany'd with a ſlow Fever, and thoſe are not the leaſt fatal.

There are ſome *Exoſtoſes* that are caus'd by Blows, Falls, and other external Cauſes; others are occaſioned by the vicious quality of the Blood.

The different Kinds.

Some terminate by Diſſolution, others ſuppurate, others remain hard, and rais'd, without terminating either after one manner or another, juſt as Impoſthumes, whereof ſome are Critical, and others Symptomatical.

The different Bones, and the various Parts of the Bones which this Diſeaſe affects, might make particular Kinds; for if the *Exoſtoſis* is a Tumour of ſome Part of a Bone, 'tis alſo often the ſwelling of a whole Bone. One ſees the

the middle or the Extremities of a Bone swell'd separately, one also finds the Tumour extended all over it.

The Bones that are not entirely affected with an *Exostosis*.

The *Femur*, the *Humerus*, the *Tibia*, the *Perona*, the *Radius*, the *Cubitus*, the Ribs, and the Bones of the Hips, and *Cranium* are not generally afflicted with an *Exostosis* all over them.

Those which are affected throughout.

When the Bones of the *Carpus*, *Metacarpus*, *Tarsus*, *Metatarsus*, *Vertebræ*, &c. are seiz'd with *Exostosis*, it usually affects them throughout their whole Dimensions.

Altho' the *Exostosis* affects but one part of a Cylindrical Bone, it may swell it quite round, and in this Case the Bone will be rais'd throughout its Circumference. At other Times the *Exostosis* affects but one side only, and the Bone is only rais'd in one of its Surfaces, whether it be that which is before, or that which is behind.

The *Exostosis* that attacks the Bones which serve as Boundaries to some Cavities, may either jut outwards or swell inwardly. There are every Day to be seen some that break out externally upon the Bones of the *Cranium* on the *Sternum*, the Ribs, and the *Ossa Ilia*; and there have been seen several that were not visible outwardly, which nevertheless by their growing caused dreadful Accidents, as shall be remark'd in the sequel of this Chapter.

The different Consistence of *Exostoses*.

There are some *Exostoses* that render the Bones harder, and others that make them more spungy: 'Tis very rare for a Bone attack'd with this Distemper to retain its natural Consistence.

I have saw'd some *Exostoses* with ease, because the Bone at the Top was spungy, with others I have been put to a great deal of Trouble,

Trouble, becauſe their Hardneſs was increas'd; ſome make more reſiſtance than Ivory.

In the Examination that I have made of the *Exoſtoſis* when ſawing the Bones, I have often obſerv'd that the Conſiſtence was not the ſame throughout the whole; ſome were ſofter without, and harder within; others on the contrary were ſofter within, and harder without, ſo that neither the Conſiſtence of the one nor the other was like that of the natural Bone. In ſome I have found Fleſh, in others a ſort of Mucilage, in others *Pus*, and in others again a *Sanies*: Sometimes I have found the *Exoſtoſis* as it were wrapt in a bony *Lamina*, as hard as the Enamel of the Teeth, and the inſide more ſpongious then the *Epiphyſes*. When I ſay wrapt in it, I mean that the Part of the *Exoſtoſis* which ſtuck to the Body of the Bone was of the ſame hardneſs, and that that place being ſaw'd according to the Diameter of the *Exoſtoſis*, one might ſee the Continuation of the hard cover, which was even whiter, and much more cloſe than the ſound part of the Bone.

Different ſorts of *Exoſtoſis*.

There is hardly any one who has not ſeen *Exoſtoſes* that have riſen to a great heigth upon the Body of the Bone, and which ſcarce adher'd to it at all; others which were only join'd to it by a very narrow *Baſis*, having a very large Body and Summit; others again very flat, and of great extent which were (if I may ſo ſpeak) but like an incruſtation of the Bone, from which they were ſeparated with Eaſe.

One may reckon among the ſorts of *Exoſtoſes* what certain Authors have improperly enough call'd *Spina Ventoſa*. 'Tis an extraorpinay Diſeaſe, differently treated of, nevertheleſs I believe we ought to give more Credit to the

Engliſh

A particular *Exostosis* call'd *Spina Ventosa.*

Englisb than to any others, becauſe it often happens in their Country, and yet more in ſome Iſlands in the North that are under their Jurisdiction. It is thus deſcrib'd by the Phyſicians of that Nation.

It begins to diſcover it ſelf by Pains both in the Bones and ſoft Parts, which alter every Minute. Sometimes ſharp *Exoſtoſes* break out, whence the Pain is ſo Acute, the Bones become ſoft, and as it were diſſolved, which occaſions their breaking every where; they no longer being hard enough to keep an *Equilibrium* with the Muſcles: At other times they are Rotten, and as it were Worm-eaten; it is often attended with a *Tabes* in ſome particular Part, and ſometimes all over the Body, the Mortification of the Limbs follows, and there are ſome Skilful *Engliſh* Phyſitians who believe that the Plague of *Athens*, deſcrib'd by *Thucydides*, was accompany'd with the *Spina Ventoſa* it ſelf, becauſe they write that the Limbs, of thoſe, who were ſeiz'd with it, rotted off piecemeal.

It is alſo very probable that the Diſeaſe deſcrib'd by Mr. *Saviard*, in his Chirurgical Obſervations, is a real *Spina Ventoſa*, as well as that which we find in the famous Mr. *Courtial*'s Remarks upon the Diſeaſes incident to the Bones.

Cauſes.

The Cauſes of theſe Diſtempers are Internal, or External; they may alſo be divided into thoſe which proceed from the vicious Quality of the Juices, and thoſe produced by the diſordering of the Veſſels; What is certain is, that either the one or the other, conjointly or ſeparate, may produce this Diſtemper; whether the Diſorder of the Juices has cauſed that of the Veſſels, or the latter has occaſion'd

ſion'd the vicious quality of the former, or whether External Cauſes have produced both the one and the other.

One thing eſſential to be known, is that the Diſeaſes of the *Perioſteum* may occaſion the *Exoſtoſis* and the *Caries*. Before I proceed any farther upon the Cauſes of theſe two Diſeaſes of the Bones, I will give my Thoughts upon this Head, which will not a little contribute to the having true Ideas of the Formation of the *Exoſtoſis* and *Caries*.

Structure of the Bone, which gives a juſt Idea of the Formation of *Exoſtoſis*.

That one may rightly conceive in what the Indiſpoſition of the *Perioſteum* contributes to the Diſeaſes of the Bones, it muſt be obſerved, 1°. That the *Perioſteum* is elaſtick, adhering to the Bone throughout the whole extent of its Surface.

2°. This Membrane is pierced to give paſſage to an infinite number of very ſmall Veſſels.

3°. Theſe Veſſels go ſome way between the Surface of the Bone and the *Perioſteum*.

4°. There are little Clefts in the Surface of the Bones which are only made by the Pulſation of the Arteries, and to lodge theſe little Veſſels.

5°. The Bones are hard Bodies capable of reſiſting the Penetration of the Juices; this being ſo, I reaſon thus. The ſmall Veſſels which are between the *Perioſteum* and the Bone, can not be fill'd by the Motion of the Heart without being dilated, nor be dilated without raiſing up the *Perioſteum*. But becauſe this Impulſion of the Heart ceaſes and begins again every Inſtant, this Dilation muſt ceaſe, and be follow'd by the Action of the *Perioſteum*; this I look upon as a Spring bent upon the Surface of the Bones, which coming to be unbent,

unbent, compreſſes the Veſſels againſt the Surface of the Bone which reſiſts, and forces the Blood and the *Lympha* with more ſwiftneſs even into the moſt remote Pores of the bony Fibres: Theſe Actions and Re-actions end, and begin again every Inſtant, wherefore the *Perioſteum* muſt alſo be rais'd each moment by the Veſſels that lie underneath it, and muſt be levell'd by its Spring. This is the Office of the *Perioſteum* in its natural State, but if by any Cauſe whatver its Spring is relax'd, it can no longer quicken the Motion of the Nutritive Juices which the Veſſels bring and carry back, whence Obſtructions will happen that will be follow'd by a *Caries* or *Exoſtoſis*.

The Internal Cauſes The Rickets.

The internal Cauſes are the Rickets, the Scurvy, the Pox, the King's-Evil, or Cancers.

We have every Day examples of rickety Children that have *Exoſtoſes* in the Body of their Bones, or even in their Joints. Thoſe which are in the Body of the Bone, render it apt to be fractur'd: I have often known Fractures in the Bones of the Arm, the Fore-Arm, and the Thigh which had no other external Cauſe but a Strain. I can't without Pain ſee them drag Children by their Arm, the moſt of thoſe whom I have known thus hurt, had been roughly haled, either to make them get up a Stair, ſtep over a Kennel, or go faſter then they wou'd, or perhaps cou'd. Thoſe whoſe Thighs were broken had fall'n; nevertheleſs there are ſome who have been in this Caſe, purely by the Negligence or Brutality of thoſe who carry'd them in their Arms, by their having let them fall back, and be carry'd away by the weight of the Body,

Obſervation.

Body, whilſt their Thighs being held in their Arms were obliged either to bend or break, not being able to bear up againſt it.

The *Exoſtoſes* that cauſe theſe ſorts of Fractures, happen only becauſe they render the Bones more brittle: There are ſeveral to be found at the Ribs and their Cartilages; the *Epiphyſes* of Children that are ricketty are almoſt always affected with them, I ſhall explain the Cauſe that produces them in the Treatiſe of the *Rachitis*; only it muſt be obſerv'd that if the *Exoſtoſis* in the middle of the Bones is an occaſional Cauſe of Fractures, that of the *Epiphyſes* of the Joints produces occaſionally Luxations or *Anchyloſes*. Obſervation.

The Scorbutick *Exoſtoſes* are uncommon; the Scurvy will rather produce a *Caries* than an *Exoſtoſis*; nevertheleſs 'tis ſometimes ſeen, but 'tis obſerved, 1°. That they are not ſo high as the other, 2°. That they don't happen in all ſorts of Scurvy, and that 'tis uſually in that which is complicated with the Rickets, the King's-Evil, or the Pox, 3°. That *Exoſtoſis* never come in the Scurvy but at the Beginning, when the Blood and the *Lympha* are coagulated; for when the Scurvy has continued long enough to cauſe Solution of the Blood, it will cauſe a *Caries* ſooner than an *Exoſtoſis*. The Scorbutick Cauſes. Three Obſervations

Towards the end of the Year, 1692, and the beginning of 1693, I ſaw a number of Scorbutick Perſons at the Hoſpital of *Bouvigny* near *Dinan* upon the *Maeſe*; an Hoſpital where there was always between 4 and 500 Perſons Sick of this Diſeaſe, and yet I ſaw but three who had the *Exoſtoſis* and above 100 the *Caries*. Obſervation.

The *Exoſtoſis* were all at the Bone of the lower Jaw, in that Part where the greater

Grinders are ſituated, the Jaw was only one third larger than its natural State. Nevertheleſs I have ſeen a Soldier in the Hoſpital of *Dinan*, who died of the Scurvy, and whoſe Foot was conſiderably ſwell'd, hard, and without Fluctuation; I open'd it, and obſerv'd that all the Bones of the *Tarſus* and *Metatarſus* were *Exoſtos'd*, and the *Perioſteum* ſwell'd by a coagulated *Lympha*.

Obſervation. The Perſons in the Hoſpital of *Bouvigny* who had the Scurvey complicated with a *Caries* were the moſt unfortunate; almoſt all of them dy'd, excepting thoſe who had a ſlight *Caries* in the *Alveoli*: I obſerv'd in thoſe that I open'd that the *Perioſteum* was looſen'd from the Bone in ſeveral places, and that in many it was looſen'd from all the Bones of their Body, ſo that making an Inciſion along the Ribs, I found them naked, rugged, uneven, ſeparated from their Cartilages, and adhering but little to the Ligaments and Tendons that are faſten'd to their hinder Part. From under the *Perioſteum* there came out a dark blackiſh *Lympha*, inclining to a dark red, which had inſupportable

Obſervation. ſmell: And I found the ſame thing in making an Inciſion to the Bone, along the Arms and Legs; in ſome of them I drew out the Bones entire, excepting their *Epiphyſes*, which were retain'd by the Tendons and Ligaments, and this only happen'd to new recruited Soldiers, of which we had a great number. They fell into this Diſtemper thro' the Fatigue, the Miſery, and the bad Nouriſhment of thoſe Times; and perhaps too by the Melancholly that had ſeiz'd upon their Spirits on ſeeing themſelves in an Hoſpital, and remembring their Father's Houſes, the Loſs of the ſweets whereof they regretted.

This

This Recital is not made without Reaſon, the Scurvy is hardly ever caus'd but by Fatigues, Miſery, bad Diet, and above all Anguiſh of Mind, and Melancholly.

Sailors after a long Voyage, wherein they undergo all ſorts of Calamities, are very often afflicted with this Diſtemper. I don't pretend to exempt thoſe from this Diſeaſe who lead a voluptuous idle Life, eating only luxuriouſly, as the firſt fall into this Illneſs thro' a bad Digeſtion, the Stomach being overcharg'd in Perſons that are ſenſual and gluttonous, digeſts not a jot better. Cauſe of the Scurvy.

We ſee Men of Prudence who are in no want of any Thing, and whoſe Virtue preſerves them from all Exceſs, fall alſo into this Diſtemper, becauſe they give themſelves over to laborious Employments, are taken up with important Affairs, or Study abſtracted Science: 'Tis known that nothing is more apt to diſorder the Stomach in its Function; whence the ſame Effect happens thro' a different Cauſe. To all theſe Cauſes of the Scurvy one may add the Diſtemperature of the Seaſons, the Air, the Difference of Climates, Age, and the fair Sex.

I don't pretend to determine what Nature the Blood partakes of when it is renew'd; but by a Crude and indigeſted Chyle, things which are problematical are not proper in a Treatiſe fill'd with ſo great a number of Facts that are inconteſtable, which daily Experience embelliſhes, and never contradicts. 'Tis this Experience which makes me look upon all theſe Things as a remote Cauſes of the Scurvey. The *Hypotheſes*, upon the Nature of the Salts which form the Scorbutick *Virus*, are Arbitrary, and 'tis there that a Man of ſin- What one ought to think of the Nature of the Scorbutick *Virus*.

cerity ought to own that his Knowledge is but very imperfect; nevertheleſs we will not make a particular and new Language for our ſelves, but uſing the Terms that are receiv'd we will try to draw Conſequences not from Words, but from the Things that have been often confirm'd to us by Experience.

Experience is more certain then Syſtems.

I have ſaid before that the Scorbutick *Exoſtoſes* did not riſe ſo high above the natural Surface of the Bones as the others, 'tis Experience that teaches us this; it wou'd be difficult for me to give a Reaſon for it, unleſs I ſhou'd ſay that the Scorbutick *Virus* being an Acid, rather corrodes than Coagulates, and that it will not ſo ſoon cauſe an *Exoſtoſis* where the Juices are coagulating, as a *Caries*, the Juices whereof are known to be Corroſive. For this Reaſon I have remark'd that if the *Exoſtoſis* happens in the Scurvy, 'tis but at the beginning of that Diſtemper, when the Blood and *Lympha* are uſually in a ſtate of Coagulation, and may cauſe an *Exoſtoſis*, but this State not continuing long, they turn acid and produce a *Caries*. It muſt be obſerved that the Scurvy may be but a Pox degenerated, or elſe may have been occaſion'd by the Pox, and in this Caſe there are *Exoſtoſes* accompany'd with the Signs of the Scurvy, whereof nevertheleſs the Scurvey can't be ſaid to have been the firſt Cauſe; and there may be Signs of the Pox and Scurvy both together. In the Sequel there will be be certain marks given of both theſe Diſeaſes, that right Meaſures may be taken for their Cure.

Venereal Cauſes.

The Pox is the moſt uſual Cauſe of the *Exoſtoſis*, nevertheleſs this Symptom don't appear at the Beginning, and it ought only to be

be look'd on as one that is conſecutive of the Pox. 'Tis not at all ſtrange that a *Virus*, which is capable of coagulating the *Lympha*, ſhould produce an *Exoſtoſis*.

This *Lympha* is (as is known) the Vehicle of the Nutrive Juice of the Bones; perhaps 'tis the very thing that nouriſhes them. That the *Lympha* coagulates in the Pox is proved by all the Circumſtances which attend that Diſtemper. We will examine this Fact in the Sequel, and I ſhall content my ſelf with obſerving that all the Parts where the *Lympha* abounds are the Seat of the Pox. The *Glandulæ conglobatæ*, the Skin, the Mouth, the Inteſtines, the Joints, and even the Bones themſelves are the places where it appears, either under its uſual ſhapes in which Caſe all the World knows it) or under ſuch Masks and Diſguiſes as conceal it ſo as not to be diſcover'd, but by thoſe who know it to be a very *Proteus*. Remark.

If the Pox very ſeldom cauſes an *Exoſtoſis* immediately, 'tis that the ſtopping of the *Lympha* in the Channel of the Bone's producing an Obſtruction there is not ſufficient, it muſt alſo dilate it, diſplace the Fibres, and gathering together there, increaſe by little and little the ſize of the Tumour; therefore the Symptoms of the Pox appear ſooner in the ſoft Parts, on account of their flexibility, and later in the Bones for a contrary Reaſon. The Pocky *Exoſtoſis* does not come at firſt.

How often have Pocky *Exoſtoſes* been known to come upon People who thought themſelves free from the Pox, becauſe they otherwiſe were in perfect Health? They had had Shankers, Bubos, or Claps, whereof they believ'd themſelves perfectly cured, becauſe they had been under the Hands of Skilful Perſons, who had managed them regularly: Theſe Skilful Men All who believe themſelves free from the Pox are not ſo.

however fall moſt of them into the Error of thinking that theſe Diſtempers when encountred with Sudorifick Ptyſans, and by the *Panacea*, are radically cured without fear of Relapſe, or at leaſt of the Pox. Nevertheleſs they are miſtaken, I dare here aver, that let the moſt experienc'd Surgeon take in hand the moſt regular Patient, who has a Shanker, a Bubo, or a Clap, and give him Ptyſans and Mercurial Preparations, I dare aver, I ſay, that after having ſo done, this Surgeon neither ought nor can aſſure him that he won't have the Pox.

Obſervation. This manner of thinking will not be agreeable to all the World, but experience confirms it. There are Perſons to be ſeen every Day that have the Pox, after having had Shankers, and Bubos well cured by the Remedies abovemention'd. In ſome it breaks out ſo that none doubt of its Exiſtence, in others the Symptoms are different, which often depends upon the Time that the Patient had the Shankers, and Bubos. We will give the Reaſon of all theſe things in ſpeaking of the Signs; there I ſhall make known that thoſe who have only had Claps are not always the moſt fortunate.

How the Pox cauſes the *Exoſtoſis*. The Pox may cauſe the *Exoſtoſis*, becauſe that by coagulating the Juices it deprives them of the Power of gliding with Eaſe into the bony Channels, or of being forced thither by the Spring of the *Perioſteum*, whether theſe Juices only penetrate into the external Part of the Bone, which forms external, or ſuperficial *Exoſtoſis*, which are only incrſtated, or whether they penetrate into the inner Part, but the return of the Overplus is prevented by the ſame Cauſe; for it has been obſerv'd that the Uſe of the *Perioſteum* is not only to cauſe the Juices

Juices to penetrate the Bone, by acting upon the Veſſels that carry them into their Subſtance, but that it is to render the return of the Overplus eaſy, by compreſſing thoſe that carry them back into the Maſs of the Blood.

If *Exoſtoſes* may happen only by the alteration of the Spring of the *Perioſteum*, it may be imagin'd that the ſame alteration may happen in the Membrane of the Marrow that covers the inner Part of the Cavities, or the *Cellulæ Diploides Medullares*, becauſe this Membrane does the ſame within as the *Perioſteum* without. Remark.

The *Dura Mater* in the inner Part of the *Cranium*, the Pituitary Membrane of the Noſe, that of the *Sinus Frontalis*, *Maxillaris*, and *Cuneiformis* do the ſame; the Internal and External Cavities of the Organs of Hearing are alſo cover'd with Membranes, which perform the Office of the *Perioſteum* on the Surface of the Bones that lie under them, and muſt be ſubject to the ſame Diſeaſes, wherefore one muſt naturally think that the internal Part of the Bones, and their interior Subſtance, muſt as well as the exteriour be liable to Obſtruction, and conſequently to *Exoſtoſes* and *Caries*. Remark.

It may alſo be conceiv'd that *Exoſtoſes* will happen by the vicious Quality of the *Perioſteum* only, without any Virulency's being in the Maſs of Blood. Theſe may be call'd kindly, becauſe tney occaſion no Pains, are not detrimental to the Functions, but with reſpect to the Places they affect, and moreover when open'd, one finds no Alteration, the ſubſtance of the Bone being indeed much harder, but otherwiſe very natural.

A fine Obſervation.

I have ſeen five or ſix *Exoſtoſes* of this kind a Soldier of the Royal *Rouſſillon* Regiment came into the Hoſpital of *Liſle*, in *Flanders*, being troubled with Stone: The Operation was perform'd upon him, he dy'd, and I diſſected him, to inform my ſelf of the Nature of a Tumor, he had had fifteen Years. It was upon the Bone of the Temples, where it had grown and ſwell'd by degrees, till it became of the ſize of a ſmall Mellon. It reſembled this Fruit ſo much the more, in that it was oblong, and a great many Veins that were ſwell'd, and branch'd out upon its Surface, repreſented pretty well thoſe that are upon the Coat of a Melon.

Having laid open this Tumour and looſen'd all the *Perioſteum*, I look'd upon it at firſt as a ſort of *Hernia*, into which part of the Brain was lengthen'd; I the more readily believ'd this, becauſe I knew that the Bone of the Temples was naturally very thin in this Part. With this Thought I open'd the *Cranium*, not on the ſide where the Tumour was, but by deſtroying the *Parietalia*, the *Coronale*, the *Occiptale*, and the Bone of the Temples on the oppoſite ſide, which I did ſometimes with the Saw, and ſometimes with the Chiſel, the Mallet, and Inciſive Pincers, ſo that I diſcover'd as much of the *Dura Mater* as was neceſſary to ſee plainly that I was miſtaken in what I had imagin'd. The *Dura Mater* and the Brain had nothing particular on that ſide, and the Bone of the Temples was only monſtrous on the outſide, the inſide retain'd its natural Conformation even to the leaſt Cleft which the Veſſels uſually make by their Pulſation. I fancy'd the Tumour was an *Exoſtoſis*, and I found it to be a benign one, after having taken

Opening of the Skull.

it

it off, and ſaw'd it into two equal Parts. It was as hard and as white as Ivory, there not appearing to be any Pores in any Part of its ſubſtance.

Exoſtoſes of this kind, but very ſmall, are often ſeen on the Spine of the *Tibia*, and on the *Cranium* in Perſons who have no manner of Diſtemper, and almoſt all thoſe of whom I have ask'd the Cauſe of theſe Tumours, have told me, that they had had Falls, or Blows which having bruis'd the Body of the Bone, or the *Perioſteum*, were follow'd by this hard Tumour, which was nothing but the Nutritive Juice of the Bone diffuſed, gather'd together, and harden'd by length of Time. Obſervation.

'Tis no new Thing to ſee a Riſing up of the Bone near the *Callus* that is form'd in Fractures, which don't proceed from the ſpreading abroad of the Juices of the broken Bones, but is uſually caus'd by the ſtrong and continual Compreſſion of Compreſſes, or Splints that are too hard, or too tight bound. Remark.

I have obſerv'd in ſawing the *Callus* of Perſons who dy'd a long Time after the Cure of their Fractures, that the inſide of the *Callus* was of an hardneſs like that of theſe *Exoſtoſis*, and that no Pores appear'd therein, which might induce one to believe that the Juices which form the *Callus* congeal and harden, without preſerving a Paſſage for the Veſſels. If it be ſo, one may think that the outſide of the *Callus*, which is cover'd by the *Perioſteum*, or the Membranes of the neighbouring Parts, may have ſome Communication with the Veſſels, but that the Inſide has not, and ſubſiſts like the external part of the Teeth. Remark.

I can't

I can't pass over in Silence an Observation I made upon a Disease, almost like the Tumour just mention'd, of the Soldier's of the Royal *Roussillon*. 'Twas a young Man who had had it it Seven Years from the Time it first appear'd to that wherein he resolv'd to undergo the Operation. This Tumour was upon the upper and middle part of the *Parietalia* being above four Inches high and of a Conick Figure, four Inches in Circumference in its *Basis*, three in its middle, and two towards the Top, the End of which was slightly putrify'd. This Patient was recommended to me by one of my Friends, in whose presence I examin'd him, and promis'd to perfom his Operation, for which reason I prpa'd him by Bleeding, Purging, and Dieting. His Eminence the Cardinal *de Rohan* recommended him to me, and order'd him all the Assistance whereof he might stand in need. This uncommon Disease made some Persons curious to see it, and enviously desirous of performing the Operation, since they got my Patient away from me by secret and underhanded Practises, such as I have never made use of, apprehended nor avoided. The Patient, who reposed some Confidence in me, obtain'd as a Favour of these Usurpers that I might be present at the Operation; they proposed it to me, I refused it, and did them a Pleasure without design. They made an Incision, uncover'd the Swelling, and look'd upon it as a *Hernia* of the Brain, whereof the Bag was made by the lengthening of the Brain. They trepann'd this Tumour, at the Place where the *Caries* was, with a great deal of Difficulty, on account of its hardness; and they introduced the *Corona* till the top of the swelling touch'd the bottom of the *Corona*,

A very very fine and profitable Observation.

and

and being fatigued with an Operation as laborious as unprofitable, they dreſs'd the Patient, and put off the reſt till the next Day. They had not the ſame Trouble, the Fever that ſeiz'd upon the Patient prevented their continuing it, their raſh and plentiful bleedings did not at all diminiſh the Accidents, and a *Delirium* that follow'd carried off the Patient.

They open'd the *Cranium*, and were undeceiv'd as to the Idea they had of its being a *Hernia*, a Notion I my ſelf had of the Soldier's ſwelling, but not of this, becauſe the other had inform'd me better. The Tumour which they took off being ſaw'd, they found it full, hard, and as white as Ivory. I may certainly have the Liberty to make Reflections upon this Diſeaſe, eſpecially upon the Cauſe of ſuch a ſudden Death, but if I ſay nothing of it in this place, I reſerve to my ſelf the right of ſpeaking thereof hereafter in the Cure of *Exoſtoſes*, a ſubject whereupon this has ſome Dependance.

If there are *Exoſtoſes* whoſe inſides are harder than the Bone, as has been obſerv'd in the different kinds, there are on the contrary ſome that are only bony at the outſide, and which far from being hard at the inſide, are entirely ſoft and fleſhy. This Difference certainly does not proceed from the Cauſe, that is the ſame, I mean that Strokes, Falls, and the Diſpoſition of the *Perioſteum* may produce both the one and the other *Species*, what occaſions the Difference is the turn which the Nutritive Juice that is diffuſed takes, a thing that can't be clearly explain'd, and which I leave to go on to what is clear, certain, and, I may venture to ſay Uſeful. Remark.

This

A very curious Obſervation.

This ſort of *Exoſtoſis* whereof I have juſt been ſpeaking is more common than is thought for, and as it generally comes near the *Epiphyſes*, there is reaſon to believe that the middle of the Bones has not a ſufficient number of Blood-Veſſels to contribute to its Formation.

I perform'd a very ſingular Operation, which I am going to relate, on account of ſuch an *Exoſtoſis*, and tho' this is not the place for it, I am perſwaded it will be agrreeable to the Reader.

A Man of about 40 Years old fell off his Horſe, and got a ſlight Wound upon the Skin that was rais'd up by an *Exoſtoſis*, which for 20 Years had ben forming by little and little upon the upper *Apophyſis* of the *Tibia*. This *Exoſtoſis*, tho' twice as large as his Fiſt, was was not troubleſome, but in bad Weather.

After his Fall he had recourſe to the Surgeon of his Part of the Town, who omitted nothing in the Cure of his Wound that might procure its Re-union. It ſeem'd to heal, when a continued Fever with Paroxyſms induced him to ſend for M. *Tonelier*, Doctor Regent, and a very skilful Phyſician, who took him in hand methodically, but no purpoſe, which made him think there might be ſome hidden Cauſe, and ſuſpecting the Wound for all its good Condition in appearance, he had me call'd in. I introduced a *Stillet* into a little place in the Wound, and I diſcover'd a Bag of purulent Matter, which I open'd to the Bottom, where I perceiv'd a little Hole, thro' which my *Stillet* penetrated to the Bone, the Teguments whereof I found looſen'd about the bigneſs of the Palm of the Hand. An Inciſion in the form of a (T,) and the extirpating

tirpating of the two Angles, having laid it open to view, I perceiv'd a Piece of Bone of a triangular Figure, which being ſeparated from the whole, was ſunk in a little, and no longer kept even with the Reſt. I thought that I muſt raiſe it and draw it out, which I cou'd not do till I had firſt cut away ſloping a Part of the ſolid Piece, whith ſtrong Sciſſars. By the help of this ſloping I ran a *Myrtle-leaf* under the Piece that was ſunk in, and I took it away, making uſe of this Inſtrument as an Elevator, which done, there iſſued out a ſtinking *Pus*. This Piece being taken away, I had liberty to thruſt my Fore-Finger into the opening, and I found that this Tumour was nothing but a Lump of Fleſh encloſed in a bony Caſe, which was thick on that ſide of the Bone to which it adhered, and ſo thin every where elſe, that ſome Parts were eaſily cut with the Sciſſars, tho' they were as hard as the middle Parts of the great Bones. I cut off enough to give me leave to looſen eaſily the Lump of Fleſh, and to take it out in ſeveral large Pieces, which being put together, were a third bigger than the Fiſt. This being extracted, I put my Fingers into this ſort of *Cranium*, where I found by-places, wherein were Pieces of the ſame Fleſh that I ſeparated exactly, which laid the Bone almoſt bare. I fill'd up this great *vaccuum* with Lint, the Reſt was cover'd with Pledgets, and wrapt round with Compreſſes and Bands: He was blooded as was proper, and had a ſuitable Diet and Remedies.

The next Day I carry'd the Inſtruments that were neceſſary to break and cut away the Parts of the Bony Cavity that had reſiſted Sequel.

sisted the Sciſſars, and yet formed a consider-able Cavity, whose raised side made a Cavern, wherein 'twould have been difficult to have apply'd the Remedies proper for procuring Exfoliation. Besides if the Scar cou'd have been made, the Deformity would have been troublesome to the Patient; wherefore 'twas fit to take away these sides, and to level the Swelling to bring it as near as possible to the Natural Figure. The Mallet, the Chisel, and the Incisive Pincers, served me alternatively, and when I had demolish'd this bony Arch down to the Body of the Bone which served for its Basis, I dress'd it with Lint steep'd in the Tinctures of Myrrh and *Aloes*, until the Patient was on the mending hand, then all Things were made use of that procure an easy Exfoliation, after which the Wound cicatriz'd and heal'd.

Parallel to this Disease.

The Bony Case, and the Lump of Flesh enclosed therein, like the Brain in the Skull, will it not allow us to compare this Disease, and the Operation I perform'd, the one to the Wounds in the *Cranium*, and the other to the Trepan?

Strokes, and Falls, may hurt the Teguments only that cover the *Cranium*; and making but a Simple Fracture, one ought to attempt the Re-union, which was the Intention of the Surgeon that first dress'd our Patient. The *Pericranium* may be contused, and loosen'd from the *Cranium*, there happens an overflowing between it and the Bone, the Matter ferments, which is follow'd by Pains and a Fever, an Incision is made, the *Pus* comes out, the Tension of the *Pericranium* ceases, and the Accidents abate, which is just what befel our Patient.

The

The Fall had bruis'd, and ſeparated the Bones from the Membranes that cover'd it; the Juices being diffuſed between the one and the other, by their fermenting cauſed the Pains, the Fever and the Impoſthume, which Accidents were abated by our Opening.

In making an Inciſion on the *Cranium*, on the Teguments that are looſen'd, one not only diſcharges the *Pus*, but one lays open the Bone, and if 'tis fractured, eſpecially if 'tis depreſs'd, one Trepans to take away the Piece that is ſeparated from the whole. Had not we a fractured Bone, a Depreſſion, did not I perform the *Trepan*, when I cut away ſloping the Piece next to the Depreſſion, to put the Inſtrument under that ſerv'd as an *Elevatory*, to raiſe up and take away the Bony Piece, which the Fall had forced in upon the Lumps of Fleſh, on the inſide of this *Exoſtoſis?* Infine if they Trepan to raiſe the Pieces of Bone, they alſo Trepan to diſcharge the Blood that is diffuſed, whether it be fluid, coagulated, or changed into *Pus*. Did not I, by this Operation, make room for the Diſcharge of the *Pus* form'd under the Piece that was ſunk in, a Suppuration which occaſion'd the Fever and other Accidents, which wou'd infallibly have carry'd off the Patient, if by the means of this Operation the Cauſe had not been deſtroy'd?

This Parallel may be carry'd farther: The Commotion that happens in Blows on the the Head, perhaps happen'd to the *Exoſtoſis* of our Patient; the *Pus* that was under the Piece of the Bone that was ſunk in, was perchance cauſed as much by the Commotion as the Depreſſion. The Abſceſſes that are form'd in the Cavity of the Marrow, after a Simple

Contuſion

Contuſion of the Bone, prove ſufficiently that Commotion is not the Cauſe of a Diſtemper that is peculiar to the Brain.

The Cauſe of Scrophulous *Exoſtoſis* is not more eaſy to determine, than that of the Swelling of moſt Part of the conglobated Glands. They ſay that the *Lympha* being congeal'd produces both the one and the other, and altho' the Effects of the Scrophulous *Virus* be almoſt like thoſe of the Venereal one, there is nevertheleſs ſome Difference not only between theſe two *Virus*'s, but alſo between the two ſame Effects of theſe two various Cauſes; and they diſtinguiſh between the *Exoſtoſes*, *Abſceſſes*, *Ulcers*, *Caries*, and *Puſtules* that are Scrophulous, and thoſe that proceed from the Pox: We ſhall endeavour to make known the Difference, by giving hereafter the marks both of the one and the other.

Not but one may ſometimes be miſtaken, if one is not very careful, when the King's Evil is complicated with the Pox, or when it is only the Effect of a degenerated *Virus*. There are Perſons attack'd with the *Scrophula* who can neither be ſuſpected of having themſelves got the Pox, or of having inherited it: Others may be ſuſpected of the one or the other, ſometimes both.

May not one believe that that is free from the Pox, which ſeizes upon a ſmall number of Inhabitants in a Place where not ſo much as the name of the Pox is known? On the contrary ought not one to judge that it is Pocky when it affects a great number in a Country where the Pox is very common, becauſe ſo few Perſons get cured of it, that it is hereditary for ſo many Degrees that it degenerates, and would (to uſe that Expreſſion) denote the number of their Anceſtors, if ſome one did

not

not increaſe the Inheritance by new Acquiſitions.

We ſee every Day Perſons afflicted with the King's Evil who have been cured, and to whom it has return'd upon an impure Copulation. Remark.

Are there not Poxes obſerv'd in Practice, which have for their Symptoms an almoſt univerſal ſwelling of the conglobated Glands? Another Remark.

I have known Women who had been cured of ſeveral Scrophulous Kernels in their Youth, who on their firſt being with Child, or a little after, fell again into this Diſtemper, whether they had contracted ſome *Virus* from their Husbands, or whether the Milk ſowering in the Maſs of Blood had coagulated the *Lympha*, or laſtly whether their new Condition had ſet at liberty the old Scrophulous *Virus*, which the Remedies they had taken had only weaken'd and palliated. Obſervation.

A young Woman of Twenty Years of Age, had been in perfect Health for Ten Years, after ſhe had been cured of two Scrophulous Tumors, one in the Foot, where the Bone of the *Metatarſus*, that ſupports the great Toe, was almoſt entirely fall'n off by Exfoliation, the other at the Angle of the Jaw, where ſome Glands had been deſtroy'd by Cauſticks, and the Ulcer perfectly conſolidated. After having been Ten Years perfectly cured to all appearance, ſhe was marry'd. Her Husband, who had had Venereal Diſeaſes ill cured, had a running remaining, he gave her a *Gonorrhea*, which unfortunately was only treated as a *Gonorrhea*, and that by a Perſon of the number of thoſe who think that to ſtop the running of a Clap is to cure it. A little after this Palliative Cure of the Clap, the Glands

of the Neck, the Arm-Pit, and the Groin swell'd, the old Sores broke out afresh, the *Tarsus*, and the Angle of the Jaw were *Exostosed*. For a long Time she had only anti-scrophulous Medicines prescrib'd her, because they did not suspect the Pox, but only the Return of the King's-Evil. This long and unprofitable method of Cure occasion'd a Consultation, wherein they gave a more sincere Account of what had past, than had been done to the ordinary Surgeon, and 'twas concluded that the Return of the *Scrophula* was owing to the Pox, and that the Patient must go thro' a Course of Physick, which had all the success that cou'd be expected.

Observation.

Observation. 'Tis seen therefore that the Pox and the King's-Evil may cause *Exostoses*, whether one of these Diseases precede the other or no; but what is remarkable in the Scrophulous and Pocky *Exostosis* is, that they more generally suppurate than those that are only Venereal, and the sort of *Caries* that succeeds is always very fatal.

Observation upon the Small-Pox.

In the Small-Pox there arise Tumours, which terminate so speedily in Imposthumes, that 'twou'd be hard to remark the four Stages which the Ancients pretended to distinguish in Impostumations. The first thing that is perceiv'd is a Fluctuation, and altho' the Matter has made no stay there, one finds the Bones bare and swell'd, and often Rotten, which may proceed from two Causes, either from the sharpness of the Matter, or from its breeding under the *Periosteum*, or in the neighbourhood of the Bones.

I have known the Small-Pox attended with such virulent Abscesses, that they have laid the Bones open almost their whole length,

length, and have ſent forth ſuch a vaſt Quantity of *Pus*, that the Patients died in a *Maraſmus*, or in a *Leucophlegmatia* cauſed by the Solution of the Blood.

The *Exoſtoſes* may be Cancerous; I have ſeen ſeveral. A Woman of 50 Years of Age being afflicted with a *Cancer* in her Breaſt, ſent for me to give her ſome Relief. What I thought the propereſt was to cut off the Breaſt, the moveable Tumour, the Arm-Pits being free, and exempt from any ſwelling, the ſtrength of the Patient, her confidence in the Operation, all invited me to perform it, and ſeem'd to aſſure me of Succeſs; the ſeaſon it ſelf was not improper, I hoped for a good Iſſue, and ſhe was cured. Two Months after ſhe was ſeiz'd with an intolerable Pain in the Heel without any ſwelling, the Part was neither chang'd in Colour nor Conſiſtence, all the Remedies were uſed that are proper to aſſwage Pain, but to no purpeſe, there appear'd an *Oedema* at the Ankle Bones. Remark.

The Bone of the Heel ſwell'd by degrees, and the Skin became red and *Oedematous*, an Inciſion was made, and the *Calcaneum* was found to be ſwell'd, bare, and rotten. They ſuſpected the Pox, the Patient went thro' a Courſe of Phyſick, but the Diſeaſe increas'd ſo that the *Malleoli* ſwell'd, and the whole Foot falling into a Gangrene, made us reſolve to cut off the Leg. There broke out of the Marrow a Cancerous *Fungus* which made a conſiderable progreſs in a little Time; it became hard, painful, black and noiſome, and there iſſued out ſuch a great quantity of ſtinking ſerous Matter that the Patient ſunk under it and dy'd. Obſervation.

Another Woman, a great deal older, had for a long time a *Cancer* in her Breaſt, which gave her no diſturbance but now and then; ſhe was ſeiz'd with a Tumour in the middle of her left Thigh, for which ſhe had recourſe to Surgery. On examining her I found that the Body of the Bone was ſwell'd quite round: Three Days after it appear'd to me to be more ſo, I judged that there was an *Exoſtoſis*; the ſharp and continual Pains with ſhootings confirmed me in this thought; and their perſeverance, in ſpite of the Remedies preſcribed made me believe that the *Exoſtoſis* would Impoſthumate, and that the Conſequence would be a *Caries*. It fell out juſt ſo, after two Months conſtant ſuffering without Intermiſſion, till ſhe broke her Thigh in turning in her Bed. A Tumour of the ſame Nature broke out in her Arm, and another at the *Clavicle*; they were not ſo long painful, becauſe the Bones broke ſooner than the Thigh had done.

'Tis eaſy to imagine how difficult 'twas to move this Woman for the leaſt of her neceſſary Occaſions. The Excrements, and the Urine caus'd a Gangrene in the Buttocks and the *Os Sacrum*; and ſhe died in ſuch a deplorable Condition that Death was a Benefit to her.

Another died of a Cancer ſhe had had Eight Years, which had been Six Months ulcerated, but they would not let her undergo the Operation, becauſe it had adher'd to the Ribs from its very beginning. I diſſected the Part underneath to ſee in what the Adheſion conſiſted; and I found that all the Part which ſhou'd have been either Gland, Muſcle, or Fat, was nothing but an uniform

uniform Lump of Fleſh, almoſt as hard as the Cartilages. The Ribs that ſerved as a ſupport to this ulcerated Tumour, form'd *Exoſtoſes* in that place that were even a little rotten.

The *Caries* is a Diſeaſe very common to *Cancers*: The *Cancer* of the Noſe becomes a Diſtemper of the Bones almoſt aſſoon as of the Fleſh, and the *Caries* that follows it has often ſomething particular in it, which I can't paſs over in ſilence, but which 'twill be hard for me to deſcribe, and make underſtood by thoſe who have not ſeen it. 'Tis not a *Caries* with Worm-holes; it ſeldom happens to be ſwell'd as in the *Exoſtoſis*, but the Bones wear away, and fall off in ſuch ſmall Pieces, that they diſappear without one's perceiving any Splinters, excepting it be the laſt Piece that falls off which is pretty large, becauſe the Matter ſeizes upon the Suture that joins it to the Jaw-bone. When this laſt Part of the Noſe-bone comes off, the Piece of the Jaw-bone, to which 'tis join'd, does not ſeem rotten, nevertheleſs the *Cancer* increaſes, and the Bone waſtes without its being perceiv'd to be bare, or any Splinters being ſeen to come from it; on the contrary 'tis always hidden by a ſpungy Fleſh, which might, I think, be compared to the Aſhes that hide the Fire which conſumes a Match or rotten Wood.

I have ſometimes ſeen the Bones fall off whole, as that of the Noſe, the *Unguis*, the inferior ſpongious *Lamina*, and even the Bone of the *Pomum*; but this only happens in thoſe *Cancers* of the Face, that ſeize upon a great Part at one Time: The *Vomer*, the *Os Ethmoides*, the *Sphenoides*, the *Coronale*, and the

Os Maxillare, fall off always by imperceptible Pieces, becauſe they are of too great extent to be univerſally attack'd at once.

Beſides theſe Examples of *Exoſtoſes*, and Cancerous *Caries*, Mr. *Malaval* a Sworn Surgeon, and very famous, ſhew'd me a Cancerous *Exoſtoſis* that ſeiz'd upon the upper Parts of the *Tibia* and *Perona*, near the Knee; but as he intends to publiſh this Obſervation, I ſhall give no account of it.

The formation of this Fleſh upon the Bones in proportion as they decay and diſappear, is a *Phænomenon* hard to be explained, but there is yet more Difficulty to account for the *Metamorphoſis* of the Bones into Fleſh, a Diſeaſe which I ſhall call the Camification of the Bones, becauſe that from being hard, as they are naturally, they change into a ſubſtance altogether like Fleſh, as will be ſeen by the following Obſervations.

A Man of 50 Years Old had been for 18 Years afflicted with Pains in his Head, ſettling a little more on one ſide his Forehead than on the other; he bled very violently at the Noſe: He went to *Forge*, and the Waters relieved him a little, but on his returning home the bleeding and Pains came again, which was follow'd by two *Polypus*'s in the Noſe, a redneſs in the left Eye-lid, the *Adnata Tunica*, and the great Angle near the Noſe. There apear'd under the Skin of the great Angle a little ſoft Tumour, being almoſt without Pain, and diminiſhing when preſs'd with the Fingers, becauſe it diſcharged it ſelf partly into the Noſe, and partly into the Cavity of the *Palpebræ* by the *Punctа Lachrymalia*. The Matter was a purulent *Lympha*. This is almoſt the Account I had of it in a Memorandum

morandum that was ſent me, to which I anſwer'd, that if the Patient cou'd give us any Inſight into the matter, he might perhaps open us a ſhorter and more certain Method of Curing him. He took a Reſolution to come to *Paris*, where his Preſence inſtructed me much better, both by the Examination I made outwardly of his Ail, and by a Converſation we had together, wherein I learnt ſeveral Circumſtances which let me into the Nature of the Diſeaſe.

On examining his Ail, I made all the following Obſervations,

1°. That the left Eye was farther from the Root of the Noſe than the right, by almoſt a Finger's breadth.

2°. That the Ball of this Eye ſtuck out more than that of the Right, by a Finger's breadth.

3°. That there was under the ſoft Tumour at the great Angle, another ſwelling which was harder and reſiſted the Touch, and that far from diſappearing on Compreſſion, as the firſt did, it was much plainer to be ſeen, when the *Pus* was diſcharg'd out of the other.

4°. I obſerv'd in this Tumour a very conſiderable Aneuriſmal Pulſation; this Pulſation was felt even at the great Angle of the other Eye, at the little Angle of that which was indiſpoſed, and one might perceive it very ſtrong on touching the two *Polypus*'s with the Finger; it was even ſo conſiderable that one might ſee the Finger rais'd up, when laid upon the ſwelling, by this Pulſation which anſwer'd perfectly to that of the Arteries, ſo that on touching the Pulſe and the Tumour both at a Time, there was ſuch an ex-

act Conformity, that one might obſerve an Intermiſſion of the Pulſation, every Ten Vibrations, both in the Pulſe and the Tumour.

What cou'd one think of ſuch a ſwelling, and its Pulſation, but that it was an *Aneuriſm*? Nevertheleſs I did not judge it ſo, and I gave the following Reaſons.

1°. The *Aneuriſm* is a ſoft Tumour, and this is hard.

2°. The *Aneuriſm* goes in again, and this Tumour does not.

3°. The *Aneuriſm* is accompany'd with a whiſtling and hiſſing Noiſe that is perceivable by the Ear, and even by the Touch, and this ſwelling has neither the one nor the other.

4°. I cou'd not imagine that Arteries ſo ſmall as thoſe at the Part which was affected cou'd form ſo conſiderable an *Aneuriſm*. 'Twas objected that the leaſt Arteries can dilate themſelves extreamly, and produce great *Aneuriſms*; I anſwer'd that it was true, but that they had no Pulſation, or at leaſt ſo little that it cou'd not be perceiv'd by the Touch, which was not the Caſe of the ſwelling in Queſtion, wherein the Pulſation was as ſtrong as that of the *Carotid* Arteries.

Theſe *Phænomena* are I confeſs very hard to explain, nevertheleſs I will endeavour to ſatisfy ſuch Perſons as will be contented with the probability of Explanations drawn from the Structure of the Part, and from different Obſervations that can't be call'd in Queſtion.

I thought that the Diſeaſe was a *Carcinoma*; I mean a fleſhy Body, which being form'd

in

in the ſpongious *Lamina* of the *Ethmoides*, had grown and ſpread on different ſides.

The Patient was troubled with a Stoppage in the Noſe, at the beginning, becauſe the Diameter of the Noſtrils was diminiſh'd by the Bulk of the Excreſcence, and beſides there was a ſwelling in the Pituitary Membrane, by reaſon of the Compreſſion which this Tumour cauſed in the Blood Veſſels, which occaſion'd the Pain in the Head, and the Bleedings at the Noſe.

'Tis known that the Communication of the Internal and External Veins with each other, was only ſettled that theſe Veſſels might be a reciprocal Relief to each other, in ſerving mutually to diſcharge one another: If the Internal Veſſels of the Brain, that are next to the Part affected, can't empty themſelves into the Veſſels, that are kept ſtopt by the Part indiſpoſed, this alone muſt cauſe a Diſorder in the Brain; but this Obſtruction can not laſt, becauſe this Communication was only eſtabliſh'd for urgent Caſes, as when there is a Diſorder in the one, then the Diſcharge is made into the Veſſels of the other. Beſides 'tis known that when a Part is obſtructed, the Blood of the Arteries can't penetrate it but with Difficulty, and that what don't paſs thro' this obſtructed Part, is ſhared again amongſt the neighbouring Arteries. 'Tis for this Reaſon that in a Commotion of the Brain there enters leſs Blood into the *Cranium*, and more into the Face: On the contrary when there is an Obſtruction externally, there paſſes leſs Blood into the External *Carotid* Artery, and more into the Internal one; This is the Caſe whereof we have been ſpeaking, and 'tis this ſupernumerary quantity

tity of Blood (if I may uſe that Expreſſion) that ſwells the Internal Veſſels, compreſſes the Brain, and cauſes the Pain in the Head..

If the Pains in the Head are inſeparable from the Diſeaſe in queſtion, ought one to wonder at the bleeding at the Noſe which return'd often and abundantly, becauſe the Veſſels of the pituitary Membrane being compreſs'd, dilate themſelves, become ſubject to *Varices*, burſt and ſhed more or leſs Blood, as they are more or leſs in Diameter ?

The Patient was reliev'd by the Waters of *Forge*, becauſe they render'd the Blood more fluid, the Obſtructions were abated, and had not ſo much power over the Veſſels, wherein the Blood circulated better in ſpite even of the Compreſſion which ſtill continued.

The growing of this Fleſh may alſo have cauſed the Head-ach of it ſelf, by making an Effort to lodge it ſelf at the Expence of the neighbouring Parts, which are, as is well known, very ſuſceptible of Pain. The Redneſs of the Eye-lids was caus'd by the Compreſſion of the Veſſels that ſerve to carry back the Blood which paſſes thro' them. The Watering of the Eyes had at firſt but two Cauſes, *viz.* the Interruption of the Blood's Return into the Lachrymal Glands, and the ſwelling of the *Palpebræ* and the *Puncta Lachrymalia*. By the firſt more Tears were produced, and the ſecond preventing their running into the Noſe, the Tears overflow'd the Eye-lids, and fell upon the Cheek.

In proceſs of Time the Excreſcence of Fleſh growing larger, was a third Cauſe of the Redneſs of the Eye-lids, and of the Watering of the Eye, not only by reaſon the Com-

Compreſſion of the Veſſels was ſtronger, but alſo by the Compreſſion of the Bag of the Noſe and the *Puncta Lachrymalia.* Beſides there was an Inflamation in the Cavity of the Bag, attended with what they call a flat *Fiſtula*, which increaſing form'd a pretty high Tumour, that when compreſs'd not only diſcharg'd it ſelf in the Noſe, but in the ſequel evacuated it ſelf alſo in the *Puncta Lachrymalia.* 'Twas this ſoft ſwelling whereof we have made mention, and which being entirely clear'd of the *Pus*, diſcover'd the ſwelling which was not otherwiſe perceptible to the Eye, but only to the Touch. 'Twas alſo this ſwelling which, being Part of a greater, had been taken for an *Aneuriſmal* Tumour on account of its Pulſation. Nevertheleſs it was not one, as I have already alledg'd, and as I am going to make good by giving the Reaſon why there was a Pulſation, and why not the other Signs of an *Aneuriſm.*

In order to give a Reaſon for this it muſt be laid down for a laſting Rule that the Bones may be chang'd into Fleſh; I don't only mean that they may become ſoft as is ſeen in the Rickets, (and as is cited in the daily Memoirs, and particular Treatiſes of the Diſeaſes of the Bones,) but I mean that they have the ſame ſoftneſs as the Fleſh, being penetrated by the Blood, not as all the Bones are in their natural State, but in the ſame manner as the Inteſtines, the Glands and other Parts are. For the reſt, one may cut them with the ſame Eaſe, they make no Reſiſtance againſt the weak Efforts of a cutting Inſtrument, one can't diſcover any long Fibre therein, and in a word they are of ſuch a nature,

ture, that being separated from the Body, no one can refuse them the name of Flesh.

To return to the Tumour of our Patient, I say, that it had its Root at the *Os Ethmoides*; this Bone was become Flesh as well as the bony *Lamina* of the Nose, the *Os Planum*, and the *Os Unguis*. The Brain beating upon the *Os Ethmoides* which was carnify'd, communicated its Pulsation to it, by reason of its softness; and as this Bone was the Root and Basis of the Tumour, the Pulsation answer'd at all the Places where the Branches of this swelling had spread: One might feel it on touching both Eyes, at each great Angle, and on putting ones Fingers in the Nostrils. This Disease is, I confess, very particular, and I shall have but very few, on my side in what I advance on this Head. All I can do to procure me some is to relate the Observations that convinced me of the Fact in Question.

First Observation. 'Tis above Twenty Years since I had a Soldier under Cure, who had a Swelling as big as an Egg upon his Instep, near the jointing of the Foot with the Leg. It stuck out under the sole of the Foot, the *Aponeurosis*, that covers the Muscles, had resisted, and forced it to spread and shew it self on the Sides. This Tumour broke, and was dress'd a long time to no purpose; and 'twas resolv'd to cut off the Leg, because the Articulation was drench'd, and neither the *Tibia* nor *Perona* could secure themselves from the rapid progress of this Swelling. The Amputation being made, I dissected the Limb for my Instruction, and in the whole Compass of the Tumour, I found no solid Part but the Cartilages that cover'd the Surfaces whereby

whereby the Bones touch'd each other. All the bony Parts had the Conſiſtence of Glands, without any bony Fibres, unleſs it was in ſome Bones the moſt diſtant from the Center of the Tumour, wherein I found ſome Places that were not yet carnify'd, but which had been ſo, had the Operation been deferr'd never ſo little.

2°. Mr. *Morand*, one of my Brethren cut off a Thigh, at which I aſſiſted; after the Operation we diſſected the Articulation of the Knee, which had induced us to take off the Limb, and we found that the *Condyles* of the *Femur*, the *Epiphyſis* of the *Tibia* and the *Rotula*, were of the Conſiſtence of ſoft Fleſh, and all the Cartilages, both of the *Rotula*, the *Condyles* of the *Femur*, and the Cavities of the *Tibia*, were of their natural hardneſs; they were only become thin, and even cleft in ſome Places, becauſe the Bones which they cover'd were grown larger on their becoming Fleſh.

3°. Obſervation, A Tumour broke out in the *Carpus*, near the root of the Thumb, in the ſhape of a Wen, Liquefiers and Reſolvents were apply'd a conſiderable Time without Effect; on the contrary the Tumour increaſed. Mr. *Marechal*, firſt Surgeon to the King, was preſent, and honoured me with his Advice; which was, that I ſhould encounter the Swelling with Cauſticks, by this means 'twas diſcovered that the whole *Carpus* was withered, and that the Bones had no ſupport; the reſt of the Bones of the Hand changed in the ſame manner, and we were obliged to cut off the Patient's Wriſt, to ſave his Life. I diſſected the Hand, and found that all the Bones of the *Carpus* were carnify'd, excepting the two that form the Junction

with

with the Fore-Arm; all the reſt were become pretty ſoft Fleſh, except the Cartilages: I have even kept this piece.

4°. Obſervation, Mr. *Beudin*, Surgeon Royal of *Laval*, a Province of *Maine*, came to *Paris* to be cured of a Tumour that had ſeized on the Palm of his Hand, extended to the outſide, between the Thumb and the Bone of the *Metacarpus* that ſupports the Fore-finger, and beſides reach'd to that Part of it which ſuſtains the Middle Finger. He was advis'd to have his Hand cut off, but the need a Surgeon has of that Part, prevented his conſenting; he choſe rather, with the Hazard of his Life, to ſuffer me to diſſect his Hand to ſeparate the Tumour from the Tendons, wherewith it was blended. After the Operation, 'twas found that the Bone of the *Metacarpus*, which ſupports the Middle Finger, being changed into Fleſh, formed the Center of the Tumour, and made no manner of Reſiſtance againſt the cutting Inſtrument, nor even againſt the *Fleam*, whereof I made uſe on this Occaſion; which was again verify'd by the opening of his Body, which was perform'd by Mr. *de Garengeot* in the preſence of ſeveral Maſter Surgeons.

5°. Obſervation, 'Tis two Years ſince Mr. *Leaute*, one of my Brethren, ſent for me to an Operation which he perform'd upon a Tumour under the Eye, at the place where the Bone of the upper Jaw is join'd to that of the *Pomum*. This ſwelling, which in appearance was no larger than a Nut, extended to the Mouth, the *Sinus Maxillaris*, and the Orbit of the Eye, whence it had remov'd it ſo as to make it ſtick out a large Finger's breadth. They took away as much of this Swelling

as

as they cou'd, without meeting with any Reſiſtance from the Bones, either in entring the *Sinus Maxillaris*, in finding out its Communication with the Mouth, or in following it into the Orbit, which ſhew'd plainly that the Bones were carnify'd, as was prov'd after the Death of the Patient. The *Os Planum*, that of the *Unguis*, great part of the *Pomum*, and the *Os Maxillare* were found to have the Conſiſtence of Fleſh, not reſiſting the cutting Inſtrument, nor even the Fingers which pierc'd them with eaſe. One might penetrate even into the *Cranium*, by thruſting one's Finger thro' the *Os Cribroſum* and the *Sphenoides*, which having loſt their hardneſs, made no more Reſiſtance than if they had been of Fleſh, rather eaſy then difficult to penetrate.

6°. Obſervation, 'Tis 17 or 18 Years ſince Mr. *Marechal*, firſt Surgeon to the King, then head Surgeon of the Hoſpital of the *Charite des Hommes*, and always the firſt in the Exerciſe of his Profeſſion, ſhew'd me a young Man of 20 Years of Age whoſe left Eye ſtuck outwards above a Finger's breadth, by reaſon of a Swelling that appear'd at the great Angle of the Eye, and was attended with a Pain of the Head, Stupefaction, a Watering of the Eye, and a Drineſs of the Noſtril on the ſame ſide. This celebrated Surgeon encountred this Tumour with a Stone Cautery proportionable to its bigneſs. The Eſcar was cut to the bottom, and there came out two or three Spoonfuls of *Lympha* a little reddiſh, upon which the Eye return'd almoſt to its natural place. *Louis le Grand*, of Pious and Triumphant Memory, loſing Mr. *Felix*, his firſt Surgeon, choſe Mr. *Marechal* to ſupply his Place, whom the Publick had

not

not parted with without Regret, if they had not valued the Health of their Monarch more than their own. As his Buſineſs near the King made him overlook ſo particular a Diſeaſe, he will thank me for recalling it into his Memory, and giving an Account of it to the Publick.

The Fleſh burnt by the Cautery being fall'n off, 'twas thought that the Wound cicatriz'd, but in eight or ten Days after the fall of the Eſcars, there appeared in the middle of the opening a Riſing which ſeem'd to be a Bladder by its Softneſs, Smoothneſs, and the Eaſineſs of its being thruſt in again. It was open'd by a Lancet, the Water that came out was like that of the former, but in a ſomewhat greater Quantity: Two Days after there appear'd a third which was lanc'd after the ſame manner, but there came little out; the Eye removed from the Noſe, and ſtuck out as at the Beginning; the Head became heavy, a Fever broke out, and the Patient dy'd in a little Time in a lethargick Stupefaction.

Upon opening his *Cranium* I found nothing particular in his Brain; I only obſerv'd that the *Dura Mater* which covers the middle and lower Lobe of the Brain was conſiderably raiſed up, which induced me to take away all the Brain, that I might the more eaſily examine into the Cauſe of the *Dura Mater*'s Elevation. I rais'd up the Membrane by little and little, ſeparating the Middle of the Scaly Part of the Bone of the Temple, to which it adhered, ſo that it was confounded with the Bone, which ſeem'd to me in this Place *Cartilaginous* or Fleſhy. This done, I cut the upper Part of the Edge of the Orbit,

and

and when I came near that Piece of the *Coronale* that forms the Arch of the Orbit, I found that alſo *Cartilaginous*. Then having raiſed the *Dura Mater* with the *Scalper*, I found three Bladders full of a reddiſh Water, one in the Orbit, the other, half in the Orbit, and half in the *Cranium*, and the third in that Part of the Cavity of the Skull that is form'd by the *Os Temporis*, the Baſis of the *Sphenoides*, and half the *Apophyſis Petroſa*. Theſe Pieces of Bone. and thoſe that form the Optick Hole were of the ſame Conſiſtence as Fleſh, being firmer in ſome places, and ſofter in others, ſo this Diſpoſition reach'd from the *Apophyſis Petroſa* to the great Angle of the Eye: The *Os Unguis* and *Os Planum* were carnify'd.

Whoever would account for this *Metamorphoſis* wou'd do me a Favour; nevertheleſs 'tis no harder to explain than the Offification of Bones; and whoever can tell how the Fleſh is chang'd into Bone, may as well account for the Bones changing into Fleſh.

Diagnoſtick Signs of the Exoſtoſis.

The benign *Exoſtoſis* is not hard to diſtinguiſh, eſpecially if one reflects upon the Cauſes that have produced it, the abſence of violent Cauſes, and of any fatal Symptoms.

As a Blow may be the Cauſe of this kind of *Exoſtoſis*, there will no Signs of the Scurvy, Pox, or other Internal Cauſes, nor of the Symptoms that attend theſe Diſtempers. Not but there may happen troubleſome Accidents by reaſon of an *Exoſtoſis*, when th Tumour chances to be near any Part which is incommoded by its Figure or its ſize. For inſtance, I have ſeen one which grew perpen-

dicu'arly upon the upper and hinder Part of the External *Condyle* of the *Femur*. It cauſed no Pain when the Patient was either ſtanding or ſitting, nor even when he walk'd ſoftly; but when he walk'd faſt he felt ſharp Pains, and perceiv'd the Noiſe of the *Cliquetis*, that was occaſion'd by the rough Paſſage of the Tendon of the *Biceps* over the Tumour, this Tendon being in the Fore-part of the *Exoſtoſis* when the Patient's Leg was extended, and in the Hind-part when 'twas bent; ſo that it paſs'd alternatively backwards and forwards when the the Leg was bent and extended. When he walk'd ſoftly, this Paſſage was made with Eaſe, and the Patient was put to no Torture; on the contrary when he ran or walk'd briskly, the rubbing of the Tendon againſt the *Exoſtoſis* was grating, harſh, and painful.

A kindly *Exoſtoſis* neither cauſes any Pain of it ſelf, nor is the Skin that covers it red nor ſwell'd. I have ſeen one on the upper ſide of the Orbit towards the little Angle of the Eye, which had rais'd up the *Palpebra*, and jutted out ſo far over the Eye-ball, and the *Adnata Tunica*, that the Eye-laſhes came over the End of the Tumour that appear'd, and divided it in two, ſo that the upper half was cover'd by the Skin, and the lower reſting upon the Eye-ball, compreſs'd it in its upper External Part. The Patient now looking a ſquint, ſaw objects double, which is not uſual, for I know thoſe who hardly ſee them ſingle; but the Reaſon why this Man did ſo was, becauſe the Tumour that compreſs'd the Eye, had the ſame Effect as the Finger when put between the Eye-ball and the little *Can-*

thus;

thus; it changes the Line of Direction of the Eye, which cauſes one to ſee double.

The *Exoſtoſis* of the Soldier before-mention'd upon the *Os Temporum* gave him no Pain, but he was a little incommoded when he open'd his Mouth, becauſe the Muſcle *Crotaphitis* was very much extended, and he was forced to turn his Head to ſee the Objects that were on that ſide, becauſe the Swelling made a ſort of Mountain that obſtructed his Sight.

That of the Young Man who belong'd to the Cardinal *de Rohan* caus'd no Pain; the Deformity alone made him reſolve to have this Tumour rooted out, which ſhews that the Deformity of a Thing is not a ſufficient Motive to induce us to perform an Operation that may have ſuch fatal Conſequences, ſince he died two or three Days after the Operation.

There are *Exoſtoſes* near the Joint that may by their growth, either utterly deſtroy the Motion, or very much diminiſh it, by confining the Heads of the Bones within too narrow bounds. An *Exoſtoſis* at the inner *Malleolus* was known to be benign by the Cauſe that had produced it, which was a blow with Bowl, and yet better by its Conſequences which were not bad, ſince the Patient had had it Fifteen Years, and felt no inconvenience, but a ſtifneſs in moving his Foot to bend it.

Several others might be cited which one can't call to Mind. but I believe, I have ſaid enough to teach how to diſtinguiſh the *Exoſtoſes* that are benign from ſuch as are not.

I believe theſe *Extoſtoſes* are of the ſame Nature as a *Callus*, and that in the like matter

the miſ-ſhapen *Callus* might paſs for a benign *Exoſtoſis*, becauſe it is is not attended by any Inconvenience, and does no Injury but by its ſize, its ſhape, and its Situation.

The *Exoſtoſis* caus'd by the vicious quality of the *Perioſteum* has generally ſome preliminary Signs; it is ordinarily preceded by a Blow, a Fall, an old Ulcer, eſpecially one that is *varicoſe*, a painful Swelling, or an *Oedemateus* Tumour.

One ſees Swellings, ſmall or great, break out upon the Leg-bone; there are few Perſons but carry ſome proof of it. I have ſeen one which roſe up four Lines in heighth like an *Apophyſis Styloides* upon the middle of the *Tibia*; it caus'd very acute Pains at its firſt appearance, which were but ſlight when I firſt ſaw it, and have diminiſh'd by little and little, till they are come to nothing, ſo that at preſent it cauſes no Pain at all.

'Tis very ſeldom that old Sores don't corrupt or relax the *Perioſteum*: If 'tis corrupted a *Caries* enſues, and if 'tis only relax'd the Bone ſwells, and produces an *Exoſtoſis*, for the Reaſons we have mention'd in their place. *Hippocrates* makes this remark, when he ſays, that the Ulcers near the Bones, which remain a Year or more, impair the Bone and rot it.

Old Ulcers are always accompany'd with a Swelling of the Body of the Bone, and I have often diſſected the Legs of Perſons who have had them, wherein I have found this Tumour. I have a *Tibia*, whoſe middle is half as big again as it ought to be; I am not indeed ſure that the Perſon was free from the Pox, nevertheleſs I believe that this Swelling was not Pocky, the rather becauſe there was a

callous

callous Ulcer in the Leg for Ten or Twelve Years.

The *Varicoſe* Ulcers are yet oftner attended with a Corruption of the *Perioſteum*, and the Bone, when they are near them, becauſe the *varix* is not only a Dilatation of the Veſſels that are apparent, but alſo of the little Capillary Veſſels which muſt empty themſelves into the large ones; 'tis even partly the Reaſon why the *Varices* are almoſt always attended with an *Oedema*. Wherefore if this *Varicoſe* and *Oedematous* Diſpoſition happens to the Veſſels of the *Perioſteum*, 'tis eaſily conceiv'd that the Elaſticity of the latter will relax, and the Bone corrupt. I judge the ſame of the *Oedema* that continues a long time upon the Bone, becauſe it produces the ſame Effect.

'Twill be known that the *Perioſteum* is affected with the *Oedema*, when the Diſeaſe is fix'd and circumſcrib'd to one Point, without there being any elſewhere. I have often ſeen this *Oedema* upon the Bone of the Leg, without its appearing on the Sides: It is not ſo apparent as the common *Oedema*, it begins deep, and afterwards ſpreads outwardly. When it firſt begins the Skin is looſe over it; if you preſs your Finger lightly upon it the mark won't remain; if you preſs harder it will remain, but don't continue long, and as ſoon as it diſappears, if you remove the Skin by preſſing lightly upon it, you may feel the pitting of the *Oedema* of the *Periſteum*, which continues fix'd and immoveable, while you draw the Skin backwards and forwards over it with Eaſe.

All theſe Signs are generally ſufficient for one to judge that an *Exoſtoſis* is benign, but one may alſo do it by reaſon of the different

marks of thoſe of contrary kinds. I mean that if the Signs of the Pox, the Scurvy, *&c.* are evident, and induce one to judge that an *Exoſtoſis*, or a *Caries* is Pocky, the want of theſe Signs cauſe it to be believed not ſo, or at leaſt make one ſuſpend one's Judgment till it has been examin'd more amply, and may judiciouſly be determined, either upon certainty or probability.

Signs that the Exoſtoſis is Ricketty.

This *Exoſtoſis* is known, by being attended with the Symptoms of the *Rhachitis*, as we ſhall explain in a particular Diſcourſe that follows this. I ſhall add here that the Ricketty *Exoſtoſis* ſeizes upon young People: and that it does not always go away, altho' the Rickets ſhou'd be cured. Perſons are ſeen whoſe Joints are knotted all their Lives, who otherwiſe are in good Health, and of theſe ſome are only miſ-ſhapen by the Crookedneſs of the Bones which continues, and others by the Swelling of the *Epiphyſes*, which cou'd not be diſperſed nor diſſolved by all the Efforts of Art and Nature.

The ricketty *Exoſtoſes* are not in ſmall numbers like the others, they ſeize upon almoſt all the ſpungy Bones of the Spine and the Joints.

Other kinds of *Exoſtoſes* cauſe a great deal of Pain in the beginning, and yet more whilſt they are growing: The Pain ceaſes ſometimes when they are entirely form'd, and always when they diſperſe. On the contrary the ricketty *Exoſtoſes* cauſe no Pain from the Time of their firſt Riſe, to their intire Formation, but they cauſe ſharp and cruel ones when

when they diſperſe, and theſe Pains are ſometimes by fits, and at other times continual. This *Phœnomenon* ſeems hard to explain, nevertheleſs I believe it may proceed from two Cauſes. Firſt from the *Oedema*'s ceaſing at the *Perioſteum*, before the Body of the ſwell'd Bone is recover'd, ſo that the *Perioſteum* ſuffers, becauſe that this Membrane reſuming its *Tonus*, the Bone being ſtill ſwell'd oppoſes the contraction of its Fibres, which produces the ſame Effect as its Tenſion, or elſe from the Membranes of the Marrow and the *Succus Medullaris*, being perhaps compreſs'd by the Contraction of the Bony Fibres of the *Exoſtoſis* which happens when it diſperſes. However it be, this is certain, that Children are in violent Pain when their *Nodus*'s begin to diſperſe.

Signs that muſt accompany or precede the Scorbutick Exoſtoſis.

This Diſeaſe is to be known by all the Signs that ſhew a Melancholy Hypochondriack Diſpoſition, whereof the Scurvy is generally the Conſequence. The proper Signs of this Diſtemper are a Wearineſs and Pains in the Arms and Legs, a frequent and noiſome ſuppuration, the Breath ſmells very ſtrong, the *Saliva* is thick, viſcous and ſticking, the Teeth are ſoft, that is to ſay, that, being but looſely ſet in the Gums and the *Alveoli*, they don't chew the Food with Strength; the Gums ſwell, and become Red, darkiſh, and then Black; they ſweat a ſort of ſerous Suppuration of an intollerable ſmell, they bleed, and grow to that degree that

they hide the Teeth, coming over them a good way: The Gums ſeparate from the Teeth and leave them, and the *Alveoli* doing the ſame, the Teeth ſhake and fall out eaſily. The *Alveoli* diſcover themſelves, rot and fall out by Putrefaction if the the Diſeaſe continues, or by Exfoliation if it heals.

Hypochondriack Perſons are tender, their Heads heavy, and all the Faculties of the Soul ſeem out of Tune, eſpecially the Imagination which torments the Patient, and thoſe that attend him; he feels Pains in his Arms and Legs, and a Wearineſs in all his Limbs. He has often the Cramp in his Thighs and Legs, he falls away or becomes bloated, his Face is of a Lead colour, and his Eyes ſhew by their wildiſh Looks the Diſquiet and Terrors of his Mind. 'Tis very common to bleed at the Noſe; and a *Hæmorrhage* is a very uſual Symptom in the Wounds and Ulcers of Scorbutick Perſons. Ulcers in the Mouth are almoſt inſeparable from it, eſpecially thoſe that break out round the Gums, they alſo come in the Tongue, the Throat, the Cheeks and the Pallate: There have been ſome ſeen that have eaten quite thro' the Cheeks.

The Legs are not exempted, and it may be ſaid that after the Noſe and Mouth they are the Parts the moſt commonly attack'd by the Scorbutick *Virus*.

It has been ſeen in the beginning of this Chapter, that almoſt all the Bones of the Body or at leaſt *Perioſteum* was affected with it, ſince amongſt the Scorbutick Patients before mentioned in the Hoſpital of *Bouvignon*, there were ſome who had almoſt all

the

the Bones of their Body ſeparated from the *Perioſteum*.

I ſhould never have done if I ſhould relate the different Symptoms that attend the Scurvy; and if one would give ear to the Diſcourſes which Fear puts into the Mouths of Perſons afflicted with this Diſtemper, there are none but what they feel: No Body can complain of any Diſeaſe but they think they have it. And one may add, that no body has more Faith than them in Phyſick, but unfortunately for them, they think to find Relief every where and without Diſtinction. Moſt part of them go from Mountebank to Mountebank till Death or a Cure decide their Fates.

'Tis therefore by theſe Three Signs, or ſome of them that the Scorbutick *Exoſtoſis* or *Caries* muſt be known; I ſhall not meddle with them all, this is not a place for it, but as the Spots have been deſcrib'd by Authors I ſhall ſay a Word or two of them for the Benefit of young Surgeons who are the moſt expos'd to the Danger of confounding them with others.

Sometimes there are Spots all over the Body, at other Times only in the Leg. The Scorbutick Spots are of four Kinds; ſome are of a livid or Violet Colour, and ſpread very much; theſe only come upon the Arms and the Legs, or the *Pudenda* up to the *Anus*: I have ſometimes ſeen them on the *Palpebræ*, which render'd them like thoſe who have, as is proverbially ſaid, their Eye poched in black Butter, that is to ſay black and blew. I have ſeen ſome of theſe Spots larger than my Hand, nay ſome have ſpread over a whole Limb. This blackneſs is a true *Ecchymoſis*, the Blood being obſtructed in the Veſſels can't

circulate

circulate freely, which makes it tear and burſt ſome of them, and ſo diffuſe it ſelf and ſpread more or leſs, whence proceeds the black or Violet colour'd Spot, which depends upon the Blood's being more or leſs deep.

This Blackneſs is apt to alarm thoſe who have not experience enough to know how to diſperſe it, and has been more than once taken for a gangrenous Symptom, but 'tis eaſy to diſtinguiſh the one from the other. The Scorbutick Blackneſs is not ſo dark as that which is gangrenous, it inclines to the Violet, and ſometimes little red places may be diſtinguiſh'd therein, and even ſome that retain the natural Colour of the Skin. The gangrenous Blackneſs don't diſperſe, and this does; it may be perceived to abate by little and little, and the other on the contrary increaſes by degrees, and ſometimes with ſpeed. When one touches the Skin that is blacken'd by the Scurvy the Patient feels it, and he that has his Fleſh blacken'd by a Gangrene does not.

The Gangrenous Blackneſs has more regular Bounds than that which is Scorbutick.

Now I am ſpeaking of the Colour of the Skin in the Gangrene, I will mention an Obſervation which I made upon a *Nigro* belonging to a Reverend Father of the Order of St. *Dominick*, that was come from *Peru*. This *Negro* had a Defluxion on the *Scrotum*; I was ſent for by the Farher, who had known me ever ſince I had cured the *Conſtable* of *Navarre*, Son of the Duke *D' Alba*, whoſe Phyſician was call'd into Conſultation. His Advice was not to bleed the Patient, and to give him ſome Powders which he did not name, nor I did not know, and

I was for bleeding him plentifully and ſpeedily to prevent a *Gangreen*, which ſeiz'd him in 24 Hours, becauſe he was not. Then I would have made Scarifications to hinder or ſet bounds to the progreſs of this Diſtemper, but I met with Oppoſition from Perſons who told me that the Blackneſs of the Skin was an exceptionable Sign of a Gangrene in a Moor; neither was it upon the Blackneſs that I had affirm'd there was a Gangrene, on the contrary 'twas on the Whiteneſs: For I have obſerv'd that if the Skin of White Men blacken in the Gangrene, that of the Moors Whitens.

The black or dark Spots are not the only ſort that attend the Scurvy as we have obſerv'd; there are ſome of a Purple Colour, which are of a different Form and Bigneſs; ſome are no larger than the Point of a Pin, others are as big as a Grain of Millet, others again a little larger: They come out in Cluſters as of the ſize of a Farthing, or a Crown Piece. There are ſome ſeen as large as the Hand, which ſeem of a Violet and dark Colour; the firſt cauſe an Itching. I have known Patients who were ſenſible when ſuch little Purple Spots were coming out upon them, they had notice of it by a light Pricking, and an Itching that follow'd it.

The third ſort of Spot is red like the Bite of a Gnat, being at the Top of a Hardneſs that lies under it, and is more or leſs conſiderable, but generally they are as large as the End one's Finger, and reſemble a Puſh, excepting that the Swelling of the Puſh is ſeen and outwardly, and that the Tumour of theſe Spots lies hidden in the Body of the Skin, and ſeldom riſes outwards.

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The middle of these Spots is redder than the Sides, whereas the Purple Spots are as red at their Sides as in the Center: The Tumour which attends these Spots disappear sometimes imperceptibly, and they return to the same place, or any other with the same Ease. Sometimes they leave no mark after their going away; at other times they leave a slight Spot like a Bruise.

The 4th sort of Scorbutick Spot is Yellow; these spread very much, and have not the same degree of Yellow throughout, some places are clear, others are deeper; the Skin as one sees it in the Degrees of the dispersing of *Ecchymoses* and Contusions. All these Spots are Scurfy; the *Epidermis* peels off and falls in Scales like Bran, or Meal.

Signs of the Pocky Exostosis.

Besides what I have said in the beginning of this Chapter concerning the Marks of the Venereal *Exostosis*, I thought it necessary to add one Word of the Signs of the Pox. It may be remembred that I have observ'd that the *Exostosis* is not a primitive Symptom of this Disease, on the contrary 'tis known that it only appears in the third Stage.

There are several Signs of a Pox; a *Clap*, a *Shanker*, a *Bubo*, a *Phymosis*, and a *Paraphymosis* are generally the first Stages; the Pustules are of the second; not but that 'tis sometimes otherwise. One sees Persons who get the Pox at once, and who have *Bubos* or *Shankers* two or three Months afterwards, without having deserv'd them by any new Conversation with impure Women, 'tis observ'd every Day. I have known two Patients

tients in whom the firſt Sign of the Pox was Puſtules; the one had been above two Years without having to do with any Woman when the Puſtules came out, and the other two Months, and neither the one nor the other had ever had any other Symptoms of the Venereal Diſeaſe, but theſe Puſtules.

The Clap, which I look upon to be a Pox, is not attended with the Symptoms of this Diſeaſe when it runs plentifully, when the Running carries away with it the Pain, the ſmarting and the other Accidents; when the Matter changes Colour, and becomes White by degrees; when the quantity diminiſhes by little and little, only by the Uſe of the uſual Remedies, without the Aſſiſtance of Aſtringents, either taken inwardly, or apply'd externally by Injection; when there is no *Cordee*; when it does not fall into the *Scrotum*, when there is no Defluxion in the Joints or the Eyes; and laſtly, when no Fever comes and ſtops the Running. When the contrary to any of theſe happens one may be aſſured that the Pox won't fail of diſcovering it ſelf.

The *Shanker*, however well it may be cured, generally cauſes the Pox, eſpecially if it grows hard, if there remains any Hardneſs after the Cicatrizing of the Ulcer, if the Prepuce continues ſwell'd, or in fine, if any Gland of the Groin remain hard or larger than it ought to be.

Amongſt the great numbers of Patients afflicted with the Veneral Diſeaſe, that have been under my hands, I have found few that have had the Pox but have it one of theſe ways.

If the Clap and the Shanker may be attended with a Pox, it ought not to be doubted but the *Bubo* will alſo. The Diſtinction that is made of *Bubos* into primitive and conſecutive is juſt, but the Inference that is drawn from thence is not ſo.

'Tis true the Primitive *Bubo* pre-ſuppoſes a Tranſportation of the *Virus* from the *Penis* to the Glands of the Groin, immediately by the Lymphatick Veſſel of this Part; but it ought not therefore to be concluded that all the *Virus* is carry'd into thoſe Glands.

1°. Becauſe the Lymphatick Veſſels which go to the Glands of the Groin, are not the only ones that carry back the *Lympha* from the *Virga*. There are ſome of theſe Veſſels that go along under the *Urethra*, which diſcharge their *Lympha* in the Lymphatick Veſſels of the *Hypogaſtrium*, which is an open road whereby the *Virus* may inſinuate it ſelf immediately into the Maſs of the Blood.

2°. There are alſo other Lymphatick Ducts, which follow the *Vena-inhoneſta interna*, which paſs with it under the Arch of the *Os Pubis*, and alſo empty themſelves into the Lymphatick Veſſels of the *Hypogaſtrium*, both the one and the other of theſe Veſſels may carry the *Virus* immediately into the Maſs of the Blood.

3°. If all the *Virus* ſhou'd only take the Rout of the Lymphatick Veſſels that go to the Glands of the Groin, Can one be certain that all this infected *Lympha* ſtops at thoſe Glands? To make this poſſible there muſt be an Obſtruction immediately after Coition, which muſt be total at the Beginning, otherwiſe ſome of the *Lympha* wou'd paſs into the Blood,

Blood, and conſequently the *Virus* along with it.

4°. The Lymphatick Ducts are not the only Veſſels capable of carrying the *Virus* into the Blood, the Veins may alſo do it, and 'tis known that this Paſſage being interrupted by any Glands, the *Virus* muſt immediately mix with the Blood.

The *Bubo* whereof I ſpeak, is that which moſt Surgeons think exempt from the Pox when it ſuppurates; nevertheleſs it may be ſeen by what I have juſt ſaid, that it ought not to be truſted.

The Conſecutive *Bubo* pre-ſuppoſes that the *Virus* has paſs'd immediately into the Maſs of the Blood, and that afterwards it inſinuated it ſelf by Circulation into the Glands of the Groin by the Lymphatick Veſſels: 'Tis agreed upon that this is Pocky, no Body diſputes it; I muſt make here one Reflexion. If the *Virus* has got into the Maſs, it proves that the Glands are no ſure Barriers, ſince the *Virus* tho' (as it were) a Counterband can paſs them. Wherefore if the *Virus* can inſinuate it ſelf in ſpite of the Glands, this proves that in the Primitive *Bubo* there may remain little or much, and therefore more or leſs of the *Virus* will infuſe it ſelf into the Blood; but becauſe however little it may be it is ſufficient to corrupt the whole Maſs, it may be concluded that all *Bubos* are Pocky.

Thus the difference between a Primitive and a Conſecutive *Bubo* is, that the Primitive comes a little after the Coition, and the Conſecutive a good while after: The Primitive one is form'd at the firſt by the *Virus* that is carried immediately from the *Virga* to the Glands,

Glands, and the Conſecutive by the *Virus*, which after having circulated in the Maſs, has ſettled in the Glands either a little or a long time after; whence it ſometimes appears a Week or Fortnight, a Month, a Year, or more after the Coition, as Experience ſhews daily. By what has been before ſaid, the one does not differ eſſentially from the other: I can neither believe that in the Conſecutive *Bubo* all the *Virus* paſſes into the Maſs of Blood, without any Part's remaining in the Glands, nor that in the Primitive one, all the Infection ſtops at the Gland without any getting into the Blood; therefore the Difference between the one and the other, is only that more or leſs of the *Virus* has inſinuated it ſelf into the Maſs, or is retain'd in the Glands, and that they require more or leſs Time to appear or be form'd in. Both the one and the other may make a ſlow or a ſwift progreſs, may ſuppurate, harden or diſperſe, may effect ſeveral Glands or one only, may ſeize upon the Groin, the Armpits or the Neck.

It muſt be obſerv'd that the Primitive one which has been got by Coition, always appears at the upper Glands of the Groin; that that which has been catch'd at the Breaſt either by having given ſuck to an infected Child, or otherwiſe breaks out at the Glands neareſt the Arm-pits, and that that which is the conſequence of laſcivious kiſſes ſeizes upon the Glands the moſt contiguous to the Throat and Neck.

'Tis not the ſame with the Conſecutive *Bubo*, it may affect all the ſame Glands indifferently, and therein one may confound it

with

with the other; nevertheleſs there are Caſes wherein one can't be miſtaken.

If after an impure Coition a *Bubo* breaks out under the Armpit, it can't be deny'd but that this *Bubo* or Boil is Conſecutive; likewiſe if a Nurſe has one appears at the Neck or Groin after having given Suck, this *Bubo* is Conſecutive alſo.

If, after having kiſs'd an infected Woman laſciviouſly, a *Bubo* breaks out at the Armpit, or Groin, this *Bubo* likewiſe is Conſecutive.

Wherefore any *Bubo* that ſeizes upon the Glands, that are diſtant from the Part which contracted the Infection, is a Conſecutive *Bubo*; but every *Bubo* that affects the Glands contiguous to the Parts that have offended is not a Primitive one. It has been already proved that the Conſecutive *Bubo*'s may ſeize upon the moſt adjacent Glands, but there are *Bubo*'s that break out in the ſame Neighbourhood that can only be look'd upon as Conſecutive *Bubo*'s, altho' they appear immediately after the *Coitus*. For inſtance, if they come on the lower Glands of the Groin, 'tis known that the Lymphatick Veſſels diſcharge themſelves into the upper Glands, wherefore this *Bubo* muſt be Conſecutive, becauſe it can only have been form'd by the infected *Lympha* that is come back from the lower Extremities, and this *Lympha* cou'd not come back but that 'tis carry'd thither by the Laws of Circulation.

If a Nurſe has a *Bubo* under the Arm, this *Bubo* is Conſecutive for the ſame Reaſon, becauſe the Lymphatick Veſſels that come from the Breaſt diſcharge themſelves into the upper Glands of the Armpit.

If, immediately after lascivious kisses, a *Bubo* breaks out near the Throat, it is not so easy to distinguish it, for the Mouth is of such extent that its Lymphatick Ducts pass by an infinite number of different Ways: Wherefore we see *Bubos* break out under the Chin, above and under the Angle of the Jaw, and along the Neck as far as the Clavicles: They have been known to seize upon the Glands *Thyroides*, and even the *Thymus*. All these *Bubos* may be either Primitive or Consecutive; one can't distinguish them by their Situation, because that (as has been observ'd) the Mouth being of great Extent, the *Lympha* returns by different Ways, and may immediately discharge it self into all the Neighbouring Glands. 'Tis true that all these various Passages unite themselves into two or three on each side, the chief whereof is the famous *Ductus roriferus* of *Bissius*, which empties it self into the *Subclavian* Vessels: Wherefore there are only the *Bubos* that come behind the Ears, or the Neck, and those of the Glands *Thyroides*, or of the *Thymus*, which can be affirm'd to be *Bubos* Consecutive of wanton and impure Kisses; because the *Lympha* of the Mouth does not pass by these Ways; but this is not sufficient ground for one to assert that the others are Primitive *Bubos*, for Reasons already mention'd.

'Tis very seldom necessary, 'tis even almost always needless, to distinguish these *Bubos*, the one from the other. I have already said that both the one and the other were Pocky, and tho' the Method of curing them may seem different to many, I am of Opinion that it ought in general to be the same; and if those who think the contrary shou'd

ſhou'd reflect that moſt part of thoſe who have been under Cure for a good condition'd Pox, have been managed agreeably to that indulgent Syſtem; which only gives the Pox to thoſe over whom that Diſeaſe exerciſes all its Fury; they wou'd ſay that many who have been ſo managed are in good Health. To this I anſwer two Things, firſt that we know ſeveral Perſons who have never been under Cure, or at leaſt who have been in very ill Hands, who in appearance enjoy a perfect Health, becauſe the Pox gives Reſpite of 15, 20 and 30 Years, nay more. Secondly, who can aſſure us that thoſe whom we have treated ſo indulgently, have not ſought a Cure amongſt others of our Fraternity, who, not being ſo eaſy, have adminiſtred effectual Remedies to them: We ſee them in good Health, and we believe our Palliatives to be the Cauſe of it, by reaſon they conceal what they have done without our Knowledge; wherefore I ſhall judge an *Exoſtoſis* to be Venereal when the Patient has had a Clap, whether well or ill cured; becauſe we have obſerv'd that a Man may get the Pox at the firſt, and that the Clap may be Conſecutive, that is to ſay, a Symptom of the Pox: For in the ſame manner as the *Virus* of a Clap, whoſe running is ſuppreſs'd, may infect the Blood, this latter being infected may corrupt the *Proſtatæ* and cauſe a Clap.

If an *Exoſtoſis* follows after the Suppreſſion of a *Gonorrhea* by Injection, I ſhall judge this *Exoſtoſis* to be Pocky.

If during the running of a Clap a Fever comes and ſtops the running, the *Exoſtoſis* which enſues will be Pocky.

If an *Exoſtoſis* comes after a Clap that has been of long ſtanding and difficult to Cure, it will be Veneral.

If the Clap falls into the *Scrotum*, the *Exoſtoſis* is Pocky, the ſame may be ſaid of the other Cauſes of the Suppreſſion of a *Gonorrhea*.

The Shanker ought not to be leſs ſuſpected, but rather more, ſince the Hopes of not having the Pox, on account of a Clap, is only founded upon the Copiouſneſs of the Running that attends it; one ought the rather to apprehend the Pox after a Shanker, becauſe this Ulcer ſuppurates leſs in a Month than a Clap in a Day; wherefore when an *Exoſtoſis* ſeizes upon any one who has had Shankers, I ſhall make no ſcruple of judging it Pocky, becauſe it has been obſerv'd that the Primitive, as well as the Conſecutive, Shanker is the Pox.

I ſhall add no more concerning *Bubos*, I have ſaid enough; I have even given an Inſight into this Matter which I may venture to ſay, was but little known, and perhaps will be but ill reliſh'd; It is not my Fault, I ſpeak what I think, and which is more, what I have always been confirm'd in by above 30 Years Practice.

Tho' I don't here treat fully of the Pox, I can't forbear ſaying ſomething *en paſſent* of the Nature of the Puſtles and Warts; leaving the other more common Symptoms till another Occaſion; hoping one Day to publiſh the Obſervations whereon I ground the ſevere Judgment I paſs upon all thoſe that are affected with any Venereal Diſtemper whatſoever.

The

The Puſtules and Warts are eſteem'd by the whole World as certain Symptoms of the Pox, wherefore I ſhan't amuſe my ſelf in proving that they are the Pox it ſelf. I ſhall only deſcribe the Marks whereby to know them.

There are ſeveral kinds of Pocky Puſtules, the one are dry, the other moiſt, and both the one and the other are flat or rais'd, irregular or round, painful or not.

The dry Puſtules are alſo of ſeveral Sorts, ſome are like Tetters, ſome fiery, others Scurfy, Scaly and Scabby; ſome are Yellow, others of a Red, inclining to a Purple.

The moiſt Puſtules are apt to ſuppurate and to bleed, or run with reddiſh *Serum*; ſome of theſe lie even with the Skin, others are corroſive and attended with deep Ulcerations, others again break out in Tumours, which render the Skin uneven and rough.

The round Puſtules may be either humid or dry, but they are generally ſmall, the largeſt being about the ſize of the Little Finger Nail: There are ſome leſs that riſe up ſharp, from the ends whereof there comes out a Drop of red *Lymphe* imperceptibly. Some lie under, or in the Body of the Skin; theſe appear generally immediately after the going in of a Shanker or a *Bubo*, and are taken by the Patients for what is commonly call'd an Ebullition of the Blood. They don't Ulcerate the Skin, but they make it ſpeckled, and when they diſperſe, the *Epidermis* falls in Scales.

The irregular Puſtules are only ſo, becauſe ſeveral of them grow together in Cluſters; they may be of the ſame Quality with all thoſe before-mention'd.

The Puſtules that cauſe no Pain, are almoſt all thoſe that come after the diſappearing of the *Bubos*.

All thoſe which ſuppurate or incline to Suppuration are painful; which proceeds from the Acid Quality of the *Pus* that is bred in, or runs from, them. Several of theſe Puſtules riſe up like little Boils and don't ſuppurate, but remain a long Time red and hard: Others ſuppurate like a Boil, and grow black as a Coal, and the Ulcer that attends them is deep and hard to Cure: One may ſee by all theſe ſorts of Puſtules, both painful and ſuppurating, that thoſe who think that the Puſtules which ſuppurate are not Pocky, are deceiv'd; neither is it upon their not being painful that one muſt rely, as ſome think.

It muſt alſo be obſerv'd that the Puſtules gather to a head, or are painful, according as they are ſituated; thoſe which are bred in the bending of the Thigh, between the Buttocks, on the *Scrotum*, under the *Virga*, at that Part which reſts upon the *Scrotum*, under the Arm-pits, and behind the Ears, are both more painful on account of the friction of thoſe Parts, and more ſuppurating by reaſon they touch mutually, and the one diſcharges its *Pus* or ſerous Matter upon the other, which together with the Friction irritates, heats, and inflames them.

This is ſufficient to give an Idea of the Puſtules by their diſtinguiſhing Marks; I might ſay more, but I ſhou'd digreſs too much from my Subject; wherefore I ſhall finiſh in ſpeaking one word about the Warts.

The Wart is ſo certain a Sign of the Pox, that we cannot be miſtaken in it. It comes out upon

upon the Thighs near the Groin, the *Anus*, the *Scrotum*, and the *Virga*; thoſe which are on the Thighs, the *Scrotum*, and the Outſide of the *Virga*, are uſually only ſhaped like a Wart, but thoſe in the Bend of the Thigh, or at the *Anus*, and thoſe which come upon the *Glans*, or the Inſide of the Prepuce, have different Forms.

In the Bend of the Thigh, and at the *Anus* they are ſometimes long, high, and jagged like a Cock's Comb. Upon the *Glans* and on the Inſide of the Prepuce, they are like flatted Raſpberries. All theſe various Forms proceed from the preſſure they ſuffer, which obliges them to frame themſelves to the Parts, and hinders them from growing every way, as they do elſewhere where they are not conſtrain'd and nothing prevents their growth.

Pains in all the Limbs, Want of Sleep, Reſtleſneſs in the Legs, the Falling of the Hair of the Head and other Parts, Wearineſs, Leanneſs, Indigeſtion, a Vomiting, and Looſeneſs, the Jaundice, Inflamations in the Eyes, the *Gutta Serena*, the *Cataract*, the *Fiſtula Lachrymalis*, in the *Perinæum* and the *Anus*, thoſe which come after certain Impoſthumes; the Difficulty of hardening the *Callus* after a Fracture's being well reduced, and kept in its right poſition; all the Ulcers of the Noſe, the Eye-lids, the Throat, the *Anus*, and the Lungs; in a Word all manner of Diſeaſes may be cauſed by the Pox; and if few Perſons are of the ſame Mind, 'tis by reaſon few of them obſerve: 'Tis Obſervation, I repeat it again, that makes us Surgeons; without that we may viſit Patients, and have them under Cure, without knowing their

Diſtempers; which has made me often ſay that to ſee Patients, and ſee their Diſeaſes, were very different things: They that are Ignorant ſee more of their Patients than of their Diſeaſes, and thoſe that are Skilful ſee more of the Diſeaſes than of the Patients.

I conclude that all I have ſaid concerning the Pox ought to be conſidered, when one is to decide whether an *Exoſtoſis* be Venereal or no; and that 'tis an Ignorant Raſhneſs to affirm that an *Exoſtoſis* is not Pocky, when the Patient has been affected with any Venereal Diſtemper, however ſlight it might ſeem, and even if it were 30 or 40 Years ago, and the Patient had during all that time enjoyed the moſt perfect Health in the World. This Diſtemper has no Preſcription, it appears and diſappears, it cauſes a Symptom, which vaniſhes, and another ſucceeds; 'tis, as I before obſerv'd, a very *Proteus*.

Methinks I hear certain Perſons criticiſe upon what I ſay; but till I can anſwer their Criticiſms, let them examine whether they have ſeen a ſufficient number of Venereal Diſtempers to judge of it; whether thoſe whom they believe to be living Proofs againſt my Practice, are ſo much as they imagine, and whether what they think a radical Cure be not a Palliative. When I have finiſh'd this Treatiſe of the Diſeaſes of the Bones, I will ſet about a Treatiſe of Venereal Diſeaſes, wherein I will quote all the ſtrongeſt Arguments that are againſt what I advance of this Diſtemper; and I will refute them by ſuch convincing Reaſons and Obſervations, that I ſhall only have Prepoſſeſſion and prejudiced

Perſons

Perſons againſt me, Knowledge, Experience and Honeſty ſhall be my Judges.

Signs of Cancerous Exoſtoſes.

'Tis here that a Man muſt be very attentive to what is paſt, that he may not be miſtaken; there are hardly any *Pathognomonick* Signs known whereby to diſtinguiſh the Cancerous *Exoſtoſis*; 'tis true, one may reaſon thus, the Patient who has the *Exoſtoſis* has no Signs of the Scurvy nor of the King's-Evil; he has never run the Risk of getting the Pox, therefore his *Exoſtoſis* is Cancerous. Beſides his Swelling is of a dark Colour, it came by degrees, it was little and exactly circumſcrib'd at its firſt appearance; in a word there are no other Signs that diſcover an *Exoſtoſis* to be Cancerous, the Pain it ſelf which is ſo certain a Sign of an Occult Cancer, is not more violent here. It may alſo be judged that an *Exoſtoſis* is Cancerous when it does not yield to *Mercurial* Remedies: That of the Woman's, whereof I have made mention, whoſe Bones broke, was eaſier to judge of, becauſe this Patient had the Cancer in her Breaſt; one cou'd not be miſtaken, no more than in hers, whoſe Breaſt I took off and diſſected after her Death.

Signs of a Scrophulous Exoſtoſis.

When the Patient that has the *Exoſtoſis* has had the *Struma* in his Youth, when he has Kernels gather'd in his Neck, under his Armpits, at the Groin, when his Body is bound, his Digeſtion bad, his Complexion pale and a little

a little livid, when he has ſwellings in his Noſe, or his upper Lip, when his Eyes are weak and water, when he has a pituitous running at the Noſe; all this may make us ſuſpect that his *Exoſtoſis* is Scrophulous, eſpecially if he has been ill nurs'd, in his Youth, if he lives in a Fenny Country, if he is a *Spaniard* or *Piemonteſe*, and if his Father, Mother or other Relations have been afflicted with this Diſtemper.

One is not miſtaken in *Exoſtoſes* that come after the Small Pox, the Diſeaſe is not long e're it appears, and the purulent Defluxions that ſeize upon the Parts near the Bone, foretell the approach of an *Exoſtoſis* or *Caries*. Theſe Defluxions come in a Days time, and the Fluctuation of the ſuppurated Matter is almoſt as ſudden as the Tumour. I have open'd a great Number of theſe Abſceſſes, and I have almoſt always found the Bones bare, *Exoſtos'd*, or putrify'd. M. *Barbeſſon* one of my Brethren ſent for me to a Conſultation for the Child of the Maſter of a Bagnio, for whom he had already lanc'd two Impoſthumes, one at the Elbow and the other at the Knee: That at the Elbow cured pretty eaſily, and without any ſenſible Exfoliation, altho' the Bones were bare. The other at the Knee had laid open the *Rotula*, ſo that the bony Part of it was entirely ſeparated from the Cartilages, Ligaments, and *Aponeuroſes*, without the Cavity of the Articulation's having ſuffer'd by it: The *Pus* took its Courſe outwards, and the Cartilages that cover and ſurround the *Rotula* remaining whole and ſound, the Joint was preſerv'd. This Obſervation is very curious.

Prognoſtick.

Prognoſtick.

The benign *Exoſtoſes* are only curable by Manual Operation, which is not adviſeable unleſs the Situation of the *Exoſtoſis* is detrimental to ſome motion, as has been obſerv'd before.

The Scorbutick *Exoſtoſis* is troubleſome, the Pocky is leſs ſo, and the Ricketty often heals of it ſelf; the Cancerous one is mortal unleſs the Limb can be cut off, and even then fatal accidents ſometimes happen by reaſon of the Defluxion of the ſame Tumour on ſome Part: The Prognoſtick of the *Caries* is the ſame. I ſhall hereafter lay down ſome Aphoriſms concerning this Diſeaſe, by the help whereof it will be better underſtood.

Of the Cure of the Exoſtoſis, and Caries.

The benign *Exoſtoſis* is only to be cured by Extirpation, but then it muſt incommode one very much in ſome of the Motions of the Body, before one ought to reſolve on it. That of his Eminence the Cardinal *de Rohan*'s Domeſtick was only a little incommodious, it never hurt him in the leaſt, but in putting on his Hat, nor wou'd not, if he wou'd have ſuffer'd that ſlight inconvenience; 'tis true the Way of rooting it out contributed a little to it. If I were obliged to perform ſuch an Operation, I wou'd do as I had deſign'd then. I had been choſen to undertake this Tumour, and my Intention was to make a Circular Inciſion in the Teguments at the Baſis of the *Exoſtoſis*, to ſaw the Swelling to cut the Teguments Starways in Three or Four Places, and particularly

larly the *Pericranium*, in order to looſen all the Stays, being convinced that when one don't take this precaution, it is upon the ſtretch, and will be inflam'd, which is follow'd by all the Symptoms, whereof this poor young Man died. Having thus cut the Teguments, I ſhou'd have apply'd the Fire, or uſed all the means to procure Exfoliation that ſhall be mention'd hereafter.

The Bony Wen of the Soldier's at *Liſle* was too large for any one to attempt to extirpate it. That which grew upon the *Condyle* of the *Femur* in the ſhape of a Stiletto might have been both hard and dangerous to have taken away; ſuch Operations muſt not be attempted, but when one is forced to it by melancholy Symptoms.

The ricketty *Exoſtoſes* and *Caries*, are cured by making uſe of the Remedies that are proper for the Rickets, whereof we ſhall take notice in the following Chapter.

The Pocky, Scorbutick, Scrophulous, and Cancerous *Exoſtoſes* and *Caries* direct us to two Things, the one is to combat and deſtroy the internal Cauſe, and the other to encounter and ſubdue the local Imperfection.

The Internal Cauſe of Scorbutick *Exoſtoſes* and *Caries* is to be remov'd by Diet, and by general and antiſcorbutick Remedies.

The Internal Cauſe of the Pocky *Exoſtoſis* is taken away by Mercurial Frictions, which procure a good condition'd Salvation; this is call'd the great Remedy, becauſe it cures in a ſhort time, eaſily and certainly. The preparations of *Mercury* that are taken at the Mouth are inſufficient Remedies, always Pernicious, and the Sudorifick Ptiſans are not more efficacious; what is moſt ſurprizing is

that

that tho' certain Perſons vend them under their Names, they find Bubbles to take them. The whole City is full of theſe Mountebanks, and the Numbers of Bills that one ſees ſet up in all Parts, giving Notice where infallible Remedies may be had for all ſorts of Diſtempers, would make the *Siameſe* believe that People cou'd not die in *Paris:* Nay they wou'd have reaſon to ask of what uſe the Phyſicians, Surgeons and Apothecaries are.

I ſhou'd be very deſirous of knowing in whoſe hands they would truſt themſelves if they were Sick; if I may preſume, theſe *Siameſe* would judge more reaſonably than moſt of our *French.*

To Cure therefore the Pocky *Exoſtoſis* and *Caries*, one muſt cure the Pox; which is not what I pretend to in this Treatiſe, that is not my Subject: I ſhall only ſhew the manner of deſtroying the local Imperfection by the different Methods of Operating in one and the other Diſtemper; and to the end that young Surgeons may be fully inſtructed in all the Operations, I will, as much as poſſible, take different Examples.

As for the *Exoſtoſis* that is only Scrophulous, it is hard to deſtroy the Internal Cauſe. The Difficulty is not ſo great when the Pox is the firſt Cauſe, nor even when the *Virus* follows the King's Evil. I ſhall not ſpeak here of the Remedies that take away the Internal Cauſes, the Local-vice, which is the *Exoſtoſis* or the *Caries*, muſt take up all my attention. As to the Cancerous *Virus* I would not do the ſame; if I knew any Remedy that would either mitigate or deſtroy it, as it cou'd not be known too ſoon, I would not wait till I publiſh'd a new Treatiſe before

I discover'd it. I confess, together with all Skillful Persons, that this *Virus* is incurable, and I believe, as well as they, that none but Quacks and Impostors will propose it. Let us leave these wretched and abominable Parasites, and let us teach young Students how to exercise our Profession with Skill, Judgment, and Dexterity.

Of the Cure of the Local Vice of the Exostosis and Caries.

One ought not to undertake *Exostoses* but when they Suppurate, or when, after having cured the Internal Cause, they continue as large as ever.

When the *Exostosis* has suppurated, one must open quite to the place where the *Pus* resides; it will either be found that it has seiz'd upon the soft Parts only, and that the Bone is cover'd with good Flesh; or else it will have exfoliated, and the Bone will be cover'd with good Flesh; but for the most part the Bone is found to be bare, rotten, and Wormeaten, and sometimes penetrated to the very Marrow.

If 'tis found that the *Pus* has only seiz'd on the soft Parts, and that the Bone be cover'd with good Flesh, 'tis sufficient to give it a free Vent by a large Opening, and to manage this Distemper like lancing of a simple Imposthume.

Observe nevertheless that altho' the Flesh may seem good, it is not always so; but a little Time will instruct one how to know it. It must be of a good Grain and firm, must grow no more than is necessary, and its growth

growth muſt not be too ſudden. It muſt be ſenſible, but yet ſo as to bear touching, muſt not bleed, and muſt be of a roſy red. On the contrary if the Fleſh that is over the Bone be ſmooth, or full of fungous excreſcencies, or if it be ſoft and grows too faſt, if it be painful or inſenſible, if it bleed, be white, of a lead colour, an angry red, or a deep or black red, that ſhews that the Fleſh is bad, and the Bone diſeas'd. In this Caſe one muſt treat the Ulcer, not like the lancing of a Simple Abſceſs, but like an Ulcer with a *Caries*, whereof mention ſhall be made in the Sequel.

Tho' the Fleſh may not be in this laſt Condition, and even tho' it may ſeem ſound, it happens in the Courſe of dreſſing that it becomes fungous; then Care muſt be taken to correct it with Powder of Allum calcin'd with red Precipitate, Lime-Water, or *Phagedœnick*-Water: The ſolution of *Mercury* with *Aquafortis*, or Spirit of Nitre is very good; one may render it more or leſs weak, by mixing with it a little Simple, or Vulnerary Water. The brown Ointment which is nothing but *Baſilicum* and Precipitate mix'd together is excellent, and may be made more or leſs ſtrong. Green Balſams in the Compoſition, whereof Braſs is an ingredient, as the Balſam *de Feuillet*, Verdigreaſe, and *Ægyptiacum* are very uſeful. Nor muſt one forget the Balſam of Steel, made with Filings diſſolv'd by Spirit of Nitre, and mix'd with Spirit of Turpentine. 'Tis very efficacious for correcting the Fleſh, and even afterwards becauſe it may be lower'd by mixing thereunto *Unguentum Hypericum*, or *Terebenthinum*. This muſt

muſt be done till the Fleſh be grown even with the Skin, and when it gets above it, one muſt Cauterize it with *Lapis infernalis*, till the Ulcer be conſolidated.

The *Exoſtoſis* being open'd, when the Exfoliation is perfect, it muſt be extracted from the Ulcer, and examine the Fleſh in order to heal it as in the two foregoing Caſes. But if the Exfoliation is not total, one muſt procure it by all the means that will be propoſed hereafter.

If, after lancing a ſuppurated *Exoſtoſis*, the Bone is only bare or elſe rotten, Worm-eaten, or pierc'd to the Marrow, one muſt obſerve what follows.

If 'tis only bare, or has what they call a dry *Caries*, or Simple Alteration, one need only lay over it a Pledgit of Lint ſteep'd in Brandy or Spirit of Wine: The Wound may be fill'd up with dry Lint, and the whole be cover'd with Pledgits, after which the reſt of the Dreſſings may be put on.

At the firſt Dreſſing the Bone muſt be examin'd, it may be dreſs'd in a Pledgit dipt in Spirit of Wine, and the brown Ointment may be apply'd to the Fleſh. But if the Bone be long in Exfoliating one muſt make uſe of the Medicines proper to haſten the Exfoliation.

In the *Caries* of the Bones, whilſt one is combating the internal Cauſe with the general Remedies and Specificks, one muſt go to work upon the rotten Place, ſo as to procure the *Exfoliation*, that is to ſay, the ſeparating of the unſound Part from the ſound. This ſeparation is without diſpute one of the Acts wherein Nature not only exerts her Power, but wherein ſhe conceals her ways of working, as much as in other Inſtances. How-

ever

ver if I may be permitted to relate what I have obſerv'd, in following her with great attention, I ſhall ſay that I have always remark'd that when the Bone don't ſweat out any Moiſture, but is dry, the Exfoliation is made ſooner then when a ſerous Matter diſtills from it; which has made me imagine that the Exfoliation is never quick in communication with the Veſſels of the ſound one. This intercourſe being cut off induces me to believe that the Juices which run in the Veſſels of the ſound Part make an Effort againſt the Part that is impaired, and that theſe Efforts being redoubled by the Reſiſtance, and reiterated every Moment of Life, are the Cauſe of the inſenſible ſeparation of the corrupt part of the Bone.

I perceive in a little while, about the Circumference of the rotten Piece, ſome new Fleſh that grows more and more; and I have reaſon to believe that in proportion as the firſt Efforts of the Juices cauſe the ſeparation, theſe nutritive Juices congeal and turn to Fleſh, and that 'tis the inſenſible growth of this Fleſh which infallibly finiſhes the ſeparation of the Diſeas'd Bone, and forces it away. I am the more ſure that Nature acts thus, in that I find this Fleſh of a good grain at the place, where the ſeparated Piece of Bone was, and becauſe this Fleſh aſſures me by its good Quality that the Bone which remains underneath is ſound.

I don't paſs the ſame Judgment on the *Caries*, when ſome matter ſweats thro' the porous Parts of the Bone. On the contrary, I ſay, that ſince the Juices find means to eſcape, and the corrupted Bone is no Obſtacle to their Paſſage, they make no Effort againſt

it, and will not ſeparate ſo ſoon. This Obſervation will help us to give a Reaſon for the manner of the Working of certain Remedies that cauſe the Bones to exfoliate ſpeedily.

Before I proceed any farther I will not let ſlip two Obſervations that I have made upon the ſweating of the Matter thro' the porous Parts of Bones that are bare. The firſt is that when this ſweating is ſerous, the *Caries* often degenerates into a Worm-eating; and the ſecond is, that when 'tis bloody, there grows Fleſh in the intervals of the Rotten Bone, which produces a *Caries* of a particular kind; the Fleſh, tho' ſoft, ſeems firm, becauſe 'tis neſtled between the Fibres of the Bone which ſupports it; by laying a Finger upon the Fleſh, one may feel little bony Inequalities that go a-croſs and ſuſtain it.

If then the *Caries* is dry, and there is no ſweating, it muſt be dreſſed ſimply, as we have ſhewn above, eſpecially if 'tis ſuperficial; but if 'tis deep, or if, tho' ſuperficial, it will not exfoliate, or if it ſweats a bloody or a ſerous Matter, the ſolution of Mercury in *Aqua fortis*, or in Spirit of Nitre, may be apply'd ſucceſsfully; and this Application muſt be repeated more or leſs accordingly as the *Caries* appears to be more or leſs deep. One muſt dreſs it with dry Lint on the Day of applying the Remedy, and with Lint ſteep'd in Spirit of Wine the Day that it is not apply'd.

When the ſweating is attended with Wormholes, or when one would prevent it, if the Solution of Mercury is not ſufficient, recourſe muſt be had to the actual Cautery, after the manner that ſhall be mention'd hereafter.

If

If the Sweating is attended with an Excreſcence of the Fleſh, as has been before ſaid, one muſt not only uſe the Actual Cautery, but a *Raſpatorum* or *Scalpum*, to raiſe up the Fleſh and ſcrape the Bone, to the End that the Fire may penetrate and eat away both the one and the other with the more Eaſe.

The *Caries* that is accompany'd with Worm-eating of the Bone is not always eaſy to cope with; I don't mean that the internal Cauſe is hard to take away, all the World is convinced of that, but I mean the Local-Vice. And indeed 'tis often that in a *Caries* of this ſort, which has been neglected, almoſt the whole body of the Bone is Worm-eaten; neither is this of ſuch fatal Conſequence when it happens to Bones that don't ſerve as Props and Supports to the Body; but if this Diſeaſe attacks the Bones of the Thigh or Leg, Arm or Fore-Arm, one may judge it very fatal, for the Bone may be broken entirely, and then the Limb will have no ſupport. For this Reaſon the Part muſt be ſuſtain'd with Tin Plates, Paſt-boards, Caſes, or other Machines, whilſt the neceſſary Operations are performing; which are to ſcale the Bone, and afterwards to burn it with the Actual Cautery, being careful always to have a *Scalpum* that cuts well, ſo as that one need not lean hard upon the Bone, for that might break it. For the ſame Reaſon the Actual Cautery, which is an Iron, muſt be as red hot as poſſible, that it may burn tho' laid on but lightly.

For the right Application of theſe one muſt have ſeveral Cauteries of the ſame Size and Figure, which muſt all be put a heating in fiery Coals, whilſt the Surgeon opens the

Wound, wipes it, and turns it with wet Linnen to preſerve it from the Fire. One muſt begin to burn at the middle of the *Caries*, and continue by the ſides, to prevent the Heat's annoying them. The Cauteries that are apply'd to the middle may be clapt on one after another, but ſome diſtance muſt be left between the applying of thoſe to the ſides of the *Caries*, that the wet Linnen may have time to cool; one may even wet the Cloth again to cool them the more ſpeedily, but muſt take care to ſqueeſe the Water well out that it mayn't run out, for that would cool the Cauteries.

This Application being made, the *Caries* muſt be dreſs'd with dry Lint; it may be ſteep'd in Spirit of Wine, if the Patient was very ſenſible of the Heat, as it happens ſometimes on applying the Cauteries to Bones that have Marrow, the reſt of the Ulcer ſpreads as uſual.

The actual Cauteries muſt not be apply'd at once, 'tis better to lay them at ſeveral Times upon the Part affected, becauſe otherwiſe the Heat might penetrate deeper then it ſhou'd. One may judge of the neceſſity of burning more or leſs by the apparent thickneſs of the *Caries*, or by its *Species*.

That which is attended with Worm-eating or a *Hyperſarcoſis* requires a ſtronger application than the others, for in the one 'tis neceſſary to deſtroy the bad Fleſh, to affect which one muſt burn quite to the ſound Parts, whence the Veſſels come that feed the Fleſh; and in the other one muſt dry up thoſe whence the ſerous Matter iſſues. The Fire muſt alſo be apply'd with more Force to the Spongi-

ous

ous Bones when they are attack'd with theſe two ſorts of *Caries*.

When the *Caries* has Communication with the Channel of the Marrow, one is obliged to trepan the Bone. They ſometimes trepan the *Sternum* to diſcharge the *Pus* that is under it, and runs out at a little Hole of the *Caries*. The *Caries* of the Marrow is ſometimes the Conſequence of Abſceſſes that are bred there; and theſe Abſceſſes proceed from Blows that have caus'd a Commotion in the Marrow, as they are known to do in the Brain. At other Times the Impoſthumes are produced by the Corruption of a Part of the Bone, which exfoliates quite thro' to the Channel of the Marrow; and when the exfoliated Piece is not taken out, it hurts the Marrow, and annoys the good Fleſh that has ſeparated it; and as this Fleſh grows over it, it hardens and inchaſes this Piece of Bone (to uſe that Expreſſion) ſo that 'tis impoſſible to extract it without a great loſs of the ſubſtance of the Bone by applying two or three Crowns of the Trepan.

It often happens that the *Exoſtoſes* cauſe theſe Abſceſſes, when they ſtick out towards the Channel of the Marrow, compreſs its Veſſels, and interrupt the Courſe of the Juices. The *Exoſtoſes* of this Kind are preceeded by great Pains which the Patients feel in the Heart of the Bone, and when they ſuppurate they break ſometimes towards the Marrow inſtead of breaking outwardly.

I had a Man under Cure for the Pox, who had ſuch an Abſceſs in the middle of the *Tibia*; he had a kindly Salivation, and his Swelling in his Leg, which was but ſmall, diſappear'd, tho' the Pains did not entirely

ceaſe. They increas'd a Fortnight after his leaving my Houſe; he came to ſee me, and I found him a little Feveriſh, and his Leg was become red and Painful outwardly. Mr. *Caſtes* and Mr. *Robordeau*, who had been Witneſſes to part of his Treatment were call'd to a Conſultation, and I gave them an Account of what they had not ſeen; they agreed that he had been regularly managed, and that for the preſent ſome Blood ſhould be taken from him, and the Part ſhould be fomented and pump'd with hot Water and Brandy; that for the reſt the Tumour being gone, the place where it had been ſhould be laid open, that being the Part where he felt moſt Pain, believing that all theſe Accidents might be cauſed by ſome matter which might be got within the *Perioſteum*.

I open'd it, but the Patient found no Relief, and two Days afterwards it was reſolv'd to apply the *Trepan*, which was painful enough, but diſcover'd to us the Cauſe of theſe Pains, by the conſiderable Diſcharge of a very ſtinking *Pus*.

The Marrow was quite diſſolv'd and the Channel ſeeming almoſt empty, cauſed me to apply three Crowns more, and to cut the Spaces that remain'd between the one and the other. The Actual Cautery was apply'd, the Exfoliation made, and the Patient cured. The late Meſſieurs *Ledran*, *Arnaud*, and my ſelf were ſent for to a Young Girl of *Provence*, on whom we perform'd the ſame Operation, with equal Succeſs.

It may be obſerv'd, *en paſſant*, that if a great deal more *Pus* comes from moſt part of the Ulcers, wherein the whole extent of the *Caries* is not diſcover'd, than the bigneſs of the Ulcer ought

ought seemingly to breed, 'tis because there is a Hole in the *Caries* that has Communication with the Channel of the Marrow; and if one does not lay open the Bone to Trepan it, the *Pus*, which always stagnates, causes the Patient's Death: I have often perform'd this Operation, and almost always with Success.

I shall finish the Cure of *Exostoses*, by saying one Word of the manner of encountring the *Exostoses*, which will not disperse upon the curing of the Pox, or any other internal Cause.

The Tumour of the Bone must be laid open, by making a large crucial Incision; one must cut away part of the Angles, and dress it dry in order to take off the Dressings the next Day, and make use of the boring Trepan, wherewith several pretty deep holes must be made pretty near one another, being careful that they fill up the whole space of the Swelling that is to be cut away. After this one must make use of a Chisel, or Googe, that is very sharp, and a leaden Mallet, wherewith one strikes moderately to cut off all that has been bored by the *Trepan*. These Holes weakening the Bone, it is the more easily cut, without running any Risque of splitting it with the Chissel. 'Tis a way the Joyners use, to prevent their Wood from splitting when they work upon it. If the Swelling be considerable, one must repeat the Strokes of the Chissel and Mallet, the rest of the Operation should be defer'd till the next Day, because the reiterated Strokes may jar the Marrow, and in the end cause an Abscess. When all is taken away, the Bone must be dress'd, as has been said, and to procure a quick Exfoliation one may apply the Solution of Mercury by

Aqua fortis, or by Spirit of Nitre. 'Tis one of the beſt Remedies that can be uſed, and I don't prefer even the Fire to it, but when the *Caries* is deep, or attended with Worm-holes, or a fleſhy Excreſence.

To end this Diſcourſe of the *Exoſtoſis* and *Caries*, I have compos'd ſome Aphoriſms, which are only the product of my Obſervations, and daily Practice.

APHORISM I.

If the Exoſtoſis *don't appear, after the Uſe of the Remedies that ought to take away the internal Cauſe, one muſt attack the Local Vice.*

We have taken notice of this Obſervation in the Cure, and it muſt be obſerv'd punctually, unleſs one diſcovers ſome Fault in the manner of adminiſtring theſe internal Remedies.

APHORISM II.

We have ſaid that the Exoſtoſis *terminates in Solution, Induration, and Suppuration; one might add Rottenneſs, when the Bone is Worm-eaten, and Deliteſcence. Since we have ſeen ſeveral* Exoſtoſes *vaniſh without the Application of any Remedies.*

APHORISM III.

The Exoſtoſis *that terminates by Solution, is the moſt perfect, provided proper Remedies are uſed, the Reaſon is eaſily conceiv'd.*

APHORISM. IV.

A Fit of an Ague ſometimes cauſes the Exoſtoſis *to diſappear: Perhaps it may be the diſappearing of*

of the Exoſtoſis *that produces the Ague, by the* Virus *again entring into the Blood.*

APHORISM V.

When the Exoſtoſis *vaniſhes without having made uſe of any Remedies, it is generally follow'd by other Symptoms. It may be ſeen diſappear in one place, and break out in another. This requires no Explanation, the Cauſe is eaſily comprehended.*

APHORISM VI.

One may be morally aſſured that the Pocky Exoſtoſis *is cured, when it goes away after the uſing of Friction, and a kindly Salivation.*

APHORISM VII.

Altho' a Pocky Exoſtoſis *ſhou'd not entirely diſappear after a regular Cure, one muſt not believe that the Patient ſtill has the Pox.* Becauſe the *Exoſtoſis* always leaves ſome mark, eſpecially if 'tis of long ſtanding, the bony Fibres not returning again to their Priſtine State ſo eaſily as the Fleſhy ones.

APHORISM VIII.

When the Exoſtoſis *is painful 'tis a ſign it grows. When the Skin that covers it is red and painful, 'tis a ſign of Suppuration.*

APHORISM IX.

When the Tumour ſoftens, and the Pain and redneſs abates, 'tis a ſign the Exoſtoſis *is Suppurated: And upon mature examination one ſhall perceive a Fluctuation.* APHO-

APHORISM X.

In the Exoſtoſis *where the Fleſh opens of it ſelf, the Opening will be Fiſtulous; the Bone being uncover'd ſweats a reddiſh and very noiſom* Sanies.

APHORISM XI.

If a bloody and thick Pus *iſſues out, if any Part of the Bone ſeparates, and comes out at the Opening, the Ulcer will heal without a* Fiſtula.

This often happens in the Pocky *Exoſtoſis* which ſuppurates, breaks, and exfoliates naturally, without any Operation, if it has been encounter'd with Mercurial Frictions.

APHORISM XII.

The Exoſtoſes *that ſuppurate generally cauſe ſharp and continual Pains, which muſt not be confounded with thoſe that are cauſed by the Elevation and Divulſions of the* Perioſteum *during the growth of the* Exoſtoſis.

APHORISM XIII.

In Ulcers, when the Bone is cover'd with Fleſh that is ſpongious, ſoft, pale, or of a Mulberry red, 'tis a ſign the Bone is corrupted.

APHORISM XIV.

If the Probe pierces eaſily thro' the Fleſh to the Bones, if it bleeds with eaſe and without Pain, the Bone is putrify'd.

APHO-

APHORISM XV.

If on examining with the Probe the Bone is found rough and uneven, 'tis impaired; unleſs it be a natural unevenneſs, which Anatomy teaches us to diſtinguiſh.

APHORISM XVI.

If after having pierced the Fleſh with the Probe, one feels at the end of it as if it touch'd rotten Wood, or wet Paſt-board, the Bone is rotten, and the rotteneſs will turn to a Worm-eating.

APHORISM XVII.

When the Plaiſters are blacken'd by the Matter, the Bone is corrupted.

If there be any Lead in the Compoſition of the Plaiſter, this ſign is equivocal, but it always ſhews that the *Sanies* is of the Nature of *Aqua fortis*, ſince it diſſolves the Lead.

APHORISM XVIII.

If the Skin about the Ulcer is of a Violet or Lead Colour, the Bone is corrupted.

APHORISM XIX.

If the Sanies *be ſerous, ſtinking, and in greater Quantity than ought to be for the bigneſs of the Ulcer, 'tis a ſign of the Bones being corrupted or rotten.*

APHO-

APHORISM XX.

The Scar that is upon the impair'd Bone is ſoft, high, and without Adheſion.

APHORISM XXI.

The Scar that comes over the Sound Bone after Exfoliation muſt be deep and firm, cleave cloſe to the Bone, and be white.

It is deep becauſe Part of the Bone being exfoliated, there is a loſs of Subſtance, and the Veſſels which ſupply the Juices are ſhrunk, becauſe they have been long expoſed to the Air, to the Influence of drying Medicines, and to the Compreſſion of the Tents wherewith the Ulcer has been long kept open.

The Scar is firm, becauſe it reſts upon the Bone, and becauſe part of the bony Juices contributed to the making it.

It cleaves cloſe, becauſe the Bone and the Fleſh have form'd out one and the ſame Scar.

It is white becauſe the Pores are very cloſe, and reflect a greater Quantity of Light.

APHORISM XXII.

When the Ulcers near the Bones are of a Year or more ſtanding, the Bones rot.

The *Caries* ſeizes on the Bones that are near old Ulcers, becauſe 'tis impoſſible during that Time the Matter of the Ulcer, and the *Oedema* it cauſes in the Parts adjoining, ſhou'd not change the natural Diſpoſition of the *Perioſteum*, which occaſions the Obſtruction of the Veſſels that paſs thro' the Bone, whence follows the Stoppage, Acidity, and Effuſion of the

the Juices, and the Deſtruction of the bony Fibres.

APHORISM XXIII.

When the Patient complains of having ſuffer'd Acute and great Pains in the Beginning of the Impoſthume that brought the Ulcer, one ought to ſuſpect a Caries, *or a Diſpoſition thereunto.*

This Pain ſhews that the *Perioſteum* has ſuffer'd, and that the Bone may have been a therein ſharer for the Reaſon above mention'd.

APHORISM XXIV.

The Bones may be impair'd without the Fleſh's being ſpoil'd; becauſe they are nouriſh'd by the *Lympha*, and this Liquor is generally the Vehicle of the *Virus*, of whatever nature it be, the rather becauſe the *Virus* is Salt, as has been obſerv'd elſewhere.

APHORISM XXV.

The Ulcers of the Articulations, the Corner of the Eye, the Mouth, and Noſe, are more frequently attended with a Caries *than the Ulcers of other Parts of the Body.* This proceeds fom theſe Or-r gans being more full of Lymphatick Veſſels, and the *Lympha* that Waters them is the Vehicle of the Pocky, Scorbutick, and Scrophulous Salts.

APHORISM XXVI.

All the Bones that are ſeparated from their Pericſteum *don't exfoliate.*

This

This is only to be understood of those Bones that have lost their *Periosteum* by Blows, Falls, or benign Impostbumes. The Vessels in the inside of the Bone always carry the Juices outwards, because they have Communication with those that are broken; and the Nutritive Juice stops there, and forms the little fleshy Buds which one sees rise insensibly upon the surface of the Bone, then unite together, and in the End cover the whole surface of the naked Bone.

APHORISM XXVII.

Bones that are laid open by external Blows, exfoliate more readily than those that are corrupted by Impostbumes or other Defluxions. Because the *Caries* that attends the latter is fed by an internal *Cause*. Now to the end that the good Flesh, which produces the Exfoliation, may grow, and force away the infected Bone, there must be no vicious Quality in the Juices that breed it. Therefore, *&c.*

APHORISM XXVIII.

The deep Caries *exfoliates with greater Difficulty than the Superficial one.*

The Reason is that their Cause is generally malignant: Besides the Piece of Bone is thicker, and much harder, for the good Flesh that grows under it, to separate.

APHORISM. XXIX.

When the Bone is ready to exfoliate, the Patient is in Pain if one touches it with the Probe, and sometimes the Ulcer bleeds.

The

This Pain proceeds from the Surface of the Bone, it being always rough and uneven on the ſide that ſeparates; and if one thruſts it with the Probe, one alſo thruſts its ſharp ends and uneven Parts againſt the good Fleſh that is under it, which cauſes the Pain; and as theſe ſame ſharp ends and uneven Parts don't fail to tear ſome Blood-Veſſels, one may then perceive the Ulcer all bloody.

APHORISM XXX.

One muſt not move or endeavour to ſeparate the Piece of Bone too ſoon.

Becauſe that if the Separation be not yet advanced enough, one may break the little Pieces that ſtill adhere to the ſound Bone, which may renew the Ulcer, or prolong the Cure.

APHORISM XXXI.

Nevertheleſs one muſt move the Bone that is ready to fall off. This muſt be done gently for fear of breaking the little Parts of the Bone that are not looſen'd; for if one don't move it, nor endeavour to draw it out in due time, the Fleſh that is bred by the ſound Bone grows over, inchaſes and keeps it in, whence there often proceeds fiſtulous Ulcers, the conſequences whereof are ſometimes mortal.

CHAP.

CHAP. XVII.

Of the Rhachitis, or Rickets.

THE *Rhachitis* is a Diſeaſe almoſt peculiar to Children; and 'tis generally obſerv'd that thoſe who are affected with it, have a livelier and more penetrating Wit than others. The Organs of their Senſes are well diſpoſed, their Face is full and well thriven, their Head large, and their Complexion ruddy. They eat much and with a good Appetite; their Liver and Spleen are of a conſiderable ſize. Their Colour and Conſiſtence is natural, and their Heart ſeems ſound, whilſt in other Parts theſe poor Children have a thouſand Diſorders which render them Objects of Surprize and Pity.

They are lean, dry'd up, and as it were Skeletons in all the other Parts of their Bodies. The Back-bone grows crooked, their Joints are relax'd, their Bones become ſoft, and their *Epiphyſes*, and almoſt all the Spongious Bones, grow knotty. Their Sutures are open, the *Fontanella* is Membranous, the Ribs are depreſs'd, the *Oſſa Illia*, and the *Omoplata* are thick, ſhrunk, and, as it were, bent back. The great Bones grow crooked, which renders all the Limbs deformed. And, in fine, when one opens thoſe that die of the Rickets, one finds that the Lungs, which cleave to the *Pleura*, are, Livid, Schirrous, and full of Abſceſſes, and that almoſt all the conglobated Glands are ſwell'd with a thick *Lympha*.

Of

Of the Cauſes of the Rickets.

All Diſtempers have but two ſorts of Cauſes, the one is in our ſelves, and the other is external. Thoſe which are in us ought only to be conſidered as ſecond Cauſes, or, to ſpeak more properly, as the Effects of the external ones. And indeed, the vicious qualities of the Spirits, the Blood, and other Fluids, which we look upon as internal Cauſes, are but the Effects of the vicious quality of the Air, the Intemperature of the Seaſons, the Exceſs or ill quality of our Diet, hard working, extreme Idleneſs, long Sleeps or over Watchings, and very often of the not governing our Paſſions.

This being the Caſe, we ought to impute the Cauſes of all our Diſtempers to the Abuſe of ſome of thoſe things which the Ancients call'd the *Non-naturals*.

In order to compaſs the Deſign which I have propoſed to my ſelf, I ſay,

1°. That this Abuſe corrupts the Humours.

2°. That the Humours being corrupted after a certain manner occaſion the Softneſs of the Bones.

3°. That this ſoftneſs hinders the regular diſtribution of the Spirits in certain Parts, by the Diſorder it produces in the *Spine*.

4°. That the Animal Spirits being interrupted in their diſtribution, cauſe the Leanneſs of the Soft Part, where the Nerves that are their Vehicles terminate.

5°. That the Softneſs of the Bones, and the Compreſſion of the Nerves are the Occaſional

casional Causes of their Crookedness, and all the other *Phœnomena*.

I begin by enquiring into the Primitive Causes of the vicious qualities of the Humours; and in Children, I find particularly Five, *viz.* The different Regions and Climates, the Teeth, when they are about cutting, or do actually cut, the Worms to which they are subject, the Ill quality of their Milk and other Aliments, and the Change of their Diet when wean'd.

The Climates have a great share in the vice of the Humours that causes the Rickets, since we see that that Disease only happens particularly in *France*, *Flanders*, *Holland*, and *England*: Undoubtedly because the Air there is less impregnated with Saline, Volatil, and Sulphurous Particles, than in the other Regions of *Europe*, and because these Principles are essential to the Hardness of the Bones as shall be observ'd.

When the Teeth begin to cut, Children are in danger of becoming Ricketty, on account of the Pain they feel, which may be occasion'd by two principal Causes. The one is in the Tooth, which has several little sharp Ends that are like so many Needles, which, piercing and tearing the Nervous Fibres of the Gums, cause very acute Pains. The other is in the Gums, when they are hard, because they resist the more against the Efforts of the Teeth in cutting, whence the Nervous Fibres that compose them are the more rudely shaken, which renders the Pain more Acute.

This Pain may cause the Rickets two ways;

1°. By reason it occasions Crying, a Fever, want of Sleep, and Convulsions; which are Acci-

Accidents ſo fatal to Children, that nothing is more apt to diſturb the Chylification, weaken the Body, corrupt the Humours, and prevent their regular Diſtribution.

2°. The Gums being inflam'd, by the Teeths irritating them, make the Children often move their Jaws, to preſs their Gums againſt each other, without doubt to mitigate their Pain; ſince one ſees that thoſe pretty Innocents are eaſed when one rubs the Gums of thoſe Teeth gently with ones Fingers, and 'tis obſerv'd that they ſtay a conſiderable Time at the Breaſt, not ſo much to Suck, as to nibble at the Nipple, and rub it againſt their tender Gums.

In ſhort they carry every thing indifferently to their Mouths to eaſe themſelves; and the repeated motion of their Jaws compreſſing the Salival Glands, cauſes the Saliva to run in a great quantity into their Mouths, and thence into their Stomach and Inteſtines, where it produces a Looſeneſs, which, being joined to the Accidents that proceed from the Pain only, reduce the Children to a miſerable Condition.

The Worms occaſion ſuch great Diſorders, that the Children who have them have but broken ſlumbers; they preſs their Jaws hard againſt each other in their Sleep, they feel convulſive Motions in their Extremities, with violent gripings that ceaſe ſome time after having eaten; they often rub their Noſes, becauſe they itch; their Bellies are ſwell'd, their Complection is ſometimes red, ſometimes pale, they become pale, have a devouring Appetite, a dry Cough, and their Mouth is always full of Spittle.

Causes of the broken slumbers.

They have but broken slumbers, because, the Worms are every Minute irritating the Membranes of the Intestines, and cause a reflux of Spirits that agitate them, as shall be explain'd hereafter.

Whence the Gripes

The corrosive Gripes proceed from three Causes;

1°. From the motions of the Worms against the Coats of the Intestines, which does with respect to them (but much more effectually) what a Feather or Straw does with respect to the Lips when drawn to and fro over them.

2°. From the prickings they occasion by their biting or pinching, with their Teeth; since one sees that Worms eat into Planks and Stones: Even the Fruits themselves with their Stones and Kernels, Nuts, Filbreds, and Walnuts are pierced by them.

3°. The Impression of the Verminous Matter upon the Coats of the same Intestines, is capable of causing these Gripes by the *Oxyglycon* that is contain'd in it.

'Tis from the Influence of these Vermin upon the Membranes of the Intestines, and that of the Verminous Matter upon the same Membranes, as also from the Introduction of this *Oxyglycon* into the Mass of Blood, that I shall derive the Explication of the other *Phænomena.*

The Startings happen thro' the Concussion and painful sensation of the Nerves, that cause a Reflux of the Animal Spirit, which being violently forced back into other Nerves, produce these Startings, and even the Convulsions in the Muscles where these Nerves terminate. Wherefore if this Reflux happens in the Nerves of the Arms, there will be convulsive

vulſive Motions and ſtartings in the Arm: if in the Optick Nerves, the Eyes will be in Convulſions; if it falls upon thoſe of the Lips it will cauſe a ſort of Sardonick laughter; and in fine if the Nerves which have communication with the Muſcles that move the Jaws are affected with it, this Reflux will be attended with a grating of the Teeth.

Mechaniſm that produces the Convulſive Motions.

It muſt be obſerv'd that not only theſe Convulſions, Startings and Convulſive Motions, are cauſed by the *Oxyglycon* beforemention'd, which, being got into the Maſs of Blood, acts upon the Nervous Membranes, and there cauſes Irritations which are attended with all theſe Accidents, but alſo that having inſinuated it ſelf into the Blood, it may filtrate thro' certain Veſſels, where it cauſes different *Phœnomena*; for if 'tis carry'd to the Glands of the Lungs, it cauſes a dry Cough, by its irritating the Veſſels of the Lungs.

If the Complexion of theſe Children is ſometimes Red, ſometimes Pale, it may be obſerv'd that it is Red when they Cough, becauſe the Contraction of the Breaſt and the Muſcles of the *Abdomen* compreſs the Lungs, whence the Blood is ſtopt for a Moment in the Veſſels of the Face and the *Subclavians*. On the contrary the Complexion becomes Pale when the Cough is over, becauſe the Blood that was ſtopt in the Face reſumes its Courſe thro' the *Jugulars* and *Subclavians*.

Different Colours of the Complexion.

Their Mouths are moiſten'd with Spittle, becauſe the *Oxyglycon* irritates the Salival Glands, and obliges them to diſcharge themſelves more copiouſly into the Mouth. Beſides the Muſcles of the Jaws, the Lips, and other Parts adjacent, that are in a Convulſive

Ricketty Children have their Mouths always moiſt.

Motion, compreſs theſe Glands more frequently, which occaſions the Diſcharge of that Liquor which is ſeen to flow out of their Mouths.

They often rub their Noſes.

They rub their Noſes, becauſe they feel an Itching therein, which proceeds from the *Oxyglycon* that has inſinuated it ſelf therein with the *Mucus*, and irritates the pituitary Membrane; and the Breath that paſſes thro' the Noſtrils being impregnated with this *Oxyglycon* which it has deriv'd from the Veſſels of the Lungs, muſt alſo irritate the Membrane of the Noſe.

Shou'd it be objected that the Cauſe which (I take for granted, and affirm) acts upon this internal Membrane, can never excite the itching on the outſide at the Tip of the Noſe, I ſhou'd anſwer that 'tis a Senſation which the Soul carries to that place (altho' it perhaps may not be there) as it does on divers other occaſions which ſhall not be examin'd into here. In a word, it is certain that this *Oxyglycon* inſinuates it ſelf into the Blood, ſince it diſcovers it ſelf in the Spittle and Breath of Verminous Infants, as may be obſerv'd by the ſtrong ſmell that exhales from their Mouth and Noſe.

The Eyes look dim.

The Convulſions in the Eyes are often attended with a certain Diſpoſition which 'tis hard to deſcribe, but which nevertheleſs is remarkable, the Eyes being as it were wild, dim, and in a word verminous. This proceeds from part of the *Oxyglycon*'s having penetrated into the *Lympha Lachrymalis*, irritated the *Palpebræ*, and caus'd an Itching therein: And as the Lachrymal Gland thro' which this Acid filtrates is near the *Muſculus Levator* of the Eye-

Eye-lids, this Muſcle being irritated contracts it ſelf and draws the Eye-lid upwards.

The dimneſs of the Eye may be accounted for the ſame way, for this Acid being mix'd with the Aqueous Humour, cauſes a ſlight Coagulation therein, that renders it leſs tranſparent.

The Fever which attends this Diſtemper, and the irregular Paroxyſms that are obſerv'd therein, are produced by the ſame Cauſe; by reaſon ſometimes more, ſometimes leſs of this Acid gets into the Maſs of Blood, which makes it ferment more or leſs. Thus one may account for the irregular Fevers and other Accidents that afflict Children ſubject to Worms. In ſhort it may be ſuppoſed that ſo many Accidents muſt hinder the Digeſtion and the Chylification, whence enſues Blood of an ill Quality, and a viciouſneſs in the *Lympha* and other Humours, which prove the Cauſe of the Rickets, and an Infinite number of other Diſtempers.

If a Child has ſuck'd a ſerous Milk, without Subſtance or Conſiſtence, as often happens in Nurſes that work hard and fatigue themſelves, or in ſuch as fare hardly, have any Diſeaſe, or continue to Suckle after being with Child, if, I ſay, a Child has ſuck'd this Milk without Conſiſtence, its Blood will be clogg'd with an inſipid *Lympha*, deſtitute of Volatil and Sulphurous Salts, which far from hardening the Bones will render them the ſofter, ſince their natural Solidity depends upon the imbibing of Saline and Sulphurous Principles which are not to be found in this *Lympha*.

If Children are deprived of the uſe of good Milk, before they have moſt part of their

Teeth, not being able to chew, they often fall into a Conſumption or *Rhachitis*; becauſe the *Menſtruum* of their Stomach is not ſtrong enough to ſeparate and diſſolve all the Principles of ſolid Food, and to make a good Chyle, whence two Things enſue. One is, that the Blood which is bred from thence, being deſtitute of theſe Active Principles, will cauſe the Rickets; and the other is that the Child, not being ſtrong enough to endure the Pain, will be expoſed to all the Accidents already mentioned.

Thus it may be affirm'd that the difference of Climates, bad Milk, the Pain that attends the Breeding of the Teeth, Worms, change of Diet, and other Cauſes before cited may ſpoil the Chylification, ſo that the Blood, being deſtitute of Volatil and Sulphurous Salts, will produce a Softneſs in the Bones, if what the analyzing them teaches us be true, *viz.* that they are nouriſh'd by a Juice impregnated with theſe two Principles, and that their Hardneſs proceeds from the compleat mixture, the Application, and the Coagulation of this Juice in the interiour Membranes, and the extremities of the Bony Channels.

Of all the Bones, thoſe that are moſt Porous are moſt eaſily ſoften'd; wherefore the *Vertebræ* grow ſoft the firſt, and having loſt their Firmneſs they muſt preſs one upon another, whence they leave leſs ſpace between the Holes that are made by their Hollows for the coming out of the Nerves, and theſe Nerves which iſſue from the Marrow of the Spine are compreſs'd, which hinders the flowing of the Animal Spirits into the Parts where the Nerves diſtribute themſelves; and as the Animal Spirits conduce to the nouriſhment

of

of the Parts, as ſhall be proved in the ſequel, thoſe which don't receive a ſufficient quantity of them muſt ſink, grow dry, and Lean.

Upon theſe Principles it will be eaſy to explain ſeveral *Phœnomena* that attend theſe Diſeaſes, which I ſhall do after having accounted for the Crookedneſs of the Bones.

Of the Crookedneſs of the Bones in the Rickets.

Gliſſon, a famous *Engliſh* Phyſician, pretends that this Crookedneſs proceeds from the ſame Reaſon as an Ear of Corn bends towards the Sun, or a Plank, Paper, a Book, *&c.* warp towards the Fire; becauſe the Sun or the Fire attract ſome of the humid Particles that are in the Pores of the ſide expoſed to them, and drive the others to the other ſide, which produces the ſame effect with regard to theſe things, as ſeveral Wedges would do if driven between the ſeparations of the Stones that compoſe a Column, for if all theſe Wedges were on the ſame ſide, the Column would bend to the oppoſite one.

Applying this Example to the Crookedneſs of Bones, he ſays that they bend when the Nouriſhment inclines more to one ſide than the other, becauſe that ſide ſwelling and growing conſiderably, obliges the oppoſite ſurface to bend. For this Reaſon the ſame Author preſcribes the rubbing the crooked ſide with penetrating Oyl, and hot Cloths, to recall the nouriſhment into this Part, and cauſe the nutritive Particles to enter its Pores to extend its Fibres, being aſſiſted by Bandages and Splints, which he orders to be apply'd to the Side oppoſite to that which is crooked.

This

This Syſtem of *Gliſſon*'s labours under ſeveral Difficulties, which have been confuted ſo often, that I ſhall think it ſufficient to ſay it might paſs for probable, if one knew any Cauſe that cou'd produce an unequal diſtribution of the Nouriſhment in any Bone, and if the Bones did not bend on that ſide where they receive moſt nouriſhment. And in effect the Legs bend outwards, whereas according to what *Gliſſon* ſays, they ſhould bow inwards.

Mayow lays down a quite different Syſtem, where he ſays, that the tendinous Strings and Muſcles are wither'd and ſhrunk for want of Nouriſhment, whilſt on the other hand the Bones far from leſſening grow larger, whence they bend, in the ſame manner as a Cord, being faſten'd to the two Ends of the Trunk of a young Tree, will oblige it to bow, becauſe this Cord can't give way when the Tree grows and ſtruggles to ſhoot upwards.

Here follow the Objections that are made againſt this Syſtem.

Firſt, There are Bones which being cover'd on all ſides, muſt be equally drawn, and ought not to bend. Nevertheleſs this happens in thoſe of the Arms and Thighs which are equally cover'd by Muſcles.

Secondly, There are no tendinous Strings that are faſten'd to the two extremities of one and the ſame Bone, as the Cord beforemention'd is to the two Ends of the Tree. On the contrary 'tis ſeen that the Muſcles which have their Origin at one Bone go beyond the Articulation to inſert themſelves in the Bone below it, whence they draw this Conſequence, that the crookedneſs of the Limbs wou'd only be in the Joints, juſt as ſuppoſing there

there was a Hinge in the middle of the Tree, the Rope cou'd only bend it at that place.

Thirdly, It is not true that the Bones grow more than the Muſcles, ſince Children have been known to be Paralitick for two or three Years, without their Bones growing crooked.

Theſe Objections don't in the leaſt deſtroy *Mayow*'s Syſtem. In anſwer to the firſt, I ſay, that altho' ſome Bones are cover'd all over with Muſcles, one muſt not therefore conclude that they are of equal Strength, on the contrary it may be ſuppoſed that the ſtrongeſt muſt get the better of the weakeſt, and force the Bones to bend.

To the ſecond may be anſwer'd, that altho' there is no tendinous String which is faſten'd to the two Ends of the ſame Bone, it ought not to be concluded that thoſe which paſs by the Articulations are leſs diſpoſed to bend the Limbs in the middle of the Bones, than in the Joints, and that for three Reaſons.

1°. The Muſcles that bend the Foot can't keep it continually in that Situation, becauſe the *Extenſors* act alternatively: And if it ſhou'd be objected, that 'tis the ſame Thing with reſpect to the Bones, what I ſhall ſay preſently will prove the contrary.

2°. The Muſcles that paſs by the Articulation are Antagoniſts, whence if they act altogether, they may perhaps make a *Tonick* Motion, wherein they can't incline the Part more to one ſide than the other; but with reſpect to the Body of the Bone, they are as, one may ſay, congenerate, becauſe they have all a Tendency to bend it the ſame way, as may be ſeen in the Leg, where the *Perona* and *Tibia* bend outwards, becauſe the *Flexors* and *Extenſors* of the Foot and Toes are all

ſituated

ſituated on the outſide, before and behind, and there is not one in the inſide of the Leg, as is known by all.

3°. The *Muſculi flexores*, or *Extenſores* muſt be always in Contraction to make a Limb crooked in the Joint, as happens in Convulſions that produce certain kinds of *Anchyloſes*. But it is not the ſame with the Bones, which may bend altho' the Muſcles be not always in Contraction; becauſe the Bones being ſoft, if they are bent by the Action of any Muſcles, they can't recover themſelves during their Inaction, the Bones having no Elaſticity which they muſt have to reſume their Priſtine ſhape; wherefore continuing in this form, they grow more crooked at the ſecond Contraction of the Muſcles, and ſo on, more and more in proportion, as the Contractions are repeated.

In Anſwer to the third Objection, I ſay, That if Children have been ſeen who have been two or three Years Paralitick without their Bones being crooked, it is not to be wonder'd at; becauſe undoubtedly the Bones of theſe Children were not ſoft; and ſecondly, becauſe the Muſcles ought to act in order to bend them, and thoſe of a Paralitick are without Action. Wherefore all the Objections that are brought againſt *Mayow*'s Syſtem, tho' they are made by a very Ingenious Man, ſhall not hinder my following it, at leaſt in part, the rather becauſe I have refuted all the Objections that have been ſtarted.

I ſay then with *Mayow*, that the Crookedneſs of the Bones proceeds from the Contraction of the Muſcles, but I add, that were it not for their ſoftneſs they cou'd not bend; that the weight of the Head and the Body contributes thereunto, and particularly the

the natural Crookedneſs that is in all the Bones: Wherefore I admit of four Cauſes of the Crookedneſs of the Bones in ricketty Perſons, their ſoftneſs, the Contraction of the Muſcles, the weight of the Body, and their natural bending.

And in order to explain the Crookedneſs of every Bone in particular, I ſay, firſt that the Spine bends becauſe of the ſoftneſs of the *Vertebræ*. Secondly by Reaſon of the Action of the *Pſoas*, *Longus*, *Scalenus*, *Rectus*, and *Obliquus* of the *Abdomen*, which drawing the Breaſt forwards, oblige the Spine to grow outwards. Thirdly, the Head being very large in Ricketty Children preſſes conſiderably upon the Spine, which having no ſolidity is obliged to give way as a leaden Pillar would when preſs'd upon by too great a Weight. Fourthly, The Neck bends behind, and grows arch'd forwards, and ſo of the other Parts of the Spine, becauſe theſe Parts are naturally a little crooked on that ſide.

The Ribs are flatted in their middle, and forced inwards by the Preſſion of the Muſcles *Pectoralis* and *Serratus Major*, ſo that theſe half Bows become leſs bent, whence the Breathing is obſtructed, becauſe the *Sternum* is thruſt forwards, which makes the Breaſt ſeem pointed.

The Cartilages, and the end of the Ribs grow larger towards the Cavity of the Breaſt, becauſe there is nothing that compreſſes them inwardly.

The *Oſſa Illia* are narrow and bend inwards, by reaſon of the Contraction of the *Glutæi* and *Iliacus*, which, drawing on their ſide, ſtraiten and bend theſe Bones.

The

The *Omoplatæ* are not ſo large as uſual, and thicker, becauſe the Muſcles, *Supra* and *Infra-Spinatus*, *Sub-Scapularis*, and *Rotundus Major* and *Minor* which cover them, draw each on their Reſpective ſides, and bring (as one may ſay) all the Circumference near the Center.

The Arm-bone hardly changes its Figure, becauſe it is ſurrounded with Muſcles of almoſt an equal ſtrength, beſides that this Bone don't ſerve as a ſupport to any other as does the Bone of the Thigh.

Nevertheleſs it muſt be obſerv'd that when the ſoftneſs of the Bones is great, it not only grows out behind and in before, at the place of the Inſertion of the *Deltoides*, and the Origin of the *Brachiæus internus*, but very often 'tis found to be half broken, as I have ſeen ſeveral Times, which happens thro' the oppoſite Action of theſe two Muſcles. This Accident not only happens to the Arm-Bone, but frequently to the Ribs, and middle Parts of the Bones of the Thigh and Leg.

The Bones of the Fore-Arm are crooked in their Fore-Part, becauſe the ſtronger Muſcles are placed there. Beſides theſe two Bones are drawn near to each other, by the Muſcles *Rotundus*, *Supinator brevis*, and *Quadratus*,

Altho' the Thigh-Bone be ſurrounded with Muſcles of almoſt equal ſtrength, it is not the leaſt crooked for ſeveral Reaſons.

Firſt becauſe 'tis expoſed to a number of Motions which can't be perform'd but by the Action of the Muſcles, and we have proved that this Action is one Cauſe of the Crookedneſs of the Bones.

2°. Becauſe 'tis the longeſt of all the Bones of the Body, and 'tis more eaſy to bend a long than a ſhort one.

3°. Be-

3°. Becauſe 'tis naturally more crooked then the others.

4°. The reaſon this Bone bends, is that it props and ſupports the weight of almoſt the whole Body, becauſe this weight has the ſame Effect with reſpect to it, as when a Man preſſes a Bow againſt the Ground to bend it.

Explication of ſeveral *Phœnomena* concerning the Ricketts.

There remains now nothing to give a compleat Idea of the *Rickets*; but to account for the largeneſs of the Head, the plumpneſs of the Face, and the vivacity of the Wit of ricketty Children; as likewiſe of the Delicacy of the Organs of their Senſes, the leaneſs of the Parts below the Neck, the largeneſs of their inward Parts, the narrowneſs of the Breaſt, and Difficulty of Breathing: In fine, to explain the Adheſion of the Lungs to the *Pleura*, their Hardneſs, Lividneſs, and the Impoſthumes that breed therein, together with the ſwelling and hardneſs of the *Thymus*, the *Glands*, the *Mediaſtinum*, the *Pancreas* and the *Meſentery*, which I ſhall do in few Words, and afterwards anſwer ſome Objections that have been made againſt this Syſtem.

As for the Bigneſs of the Head, it proceeds from the ſoftneſs of the Bones of the *Cranium*, in that their Sutures are Membranous, and the Brain which receives the Blood in greater quantity than the other Parts, becauſe of their Compreſſion, muſt grow, and conſequently open the Sutures, and ſeparate the Bones of the *Cranium* that incloſes it.

The large neſs of the Face.

The Plumpneſs of the Face, and Delicacy of the Organs of the Senſes, proceed from the Animal Spirits flowing thither without interruption, whence theſe Organs muſt be ſhaken by the leaſt impreſſion that is made upon them by external Objects.

Ricketty

Ricketty Persons very Witty

Ricketty Persons have a lively and penetrating Wit, because more filtrations are made in the Brain of such Persons than elsewhere, whence they have a greater quantity of Spirits for the Functions of the Soul. The Organs of the Senses being easily moved (as has been said) must carry back all the Sensations to the Soul more regularly, and it must judge more soundly.

All the Parts except the Head are lean.

The Parts below the Neck are more lean and fall'n away, because the Animal Spirits that are distributed there, come from the Marrow of the Spine, and the Disorder of the *Vertebræ* causes them to compress the Roots of the Nerves that come from thence, as has already been, and shall be farther observ'd in my Answers to the Objections that have been made.

The Liver and Spleen are larger

The Liver and Spleen are larger than the other Intestines, because their Nerves are the 8th Pair, and the Intercostal which come from the Brain.

They find great Difficulty in breathing.

1°. Because the Liver and Spleen, which are large, take up more place in the Breast, and render the *Diaphragm* Convex, which makes the Breast strait.

2°. The Ribs are flat and sink in the middle, which renders the extent of it yet less.

3°. The Muscles that serve to actuate the Ribs have but little Force, and the Ribs thro' their Softness and Weight are more difficult to move

4°. The Distortion of the Spine (whether it bends outwards, inward, or towards the Ribs) alters the Disposition of the Ribs, and the Direction of the Muscles that influence them.

These

Theſe four Points being well explain'd, it will not be hard to account for the Adheſion, the Impoſthumes, and the *Schirrhus* of the Lungs; nevertheleſs beſides the Difficulty of Breathing, we may diſcover two Cauſes, *viz.* the ill quality of the Blood, and the ſtrength of the Heart.

As for the Difficulty of Breathing, it may cauſe the Diſorders of the Lungs two ways; the one by affecting the Inſpiration, and the other by obſtructing the Expiration.

By the Inſpiration's being hurt, the Lungs not having a ſufficient quantity of Air to ſubtilize, attenuate and prepare the Blood, that comes thither from the right Ventricle of the Heart, will flow thither more ſlowly, and by its heavineſs and groſſneſs will be apt to cauſe ſome Obſtruction in the Capillary Veſſels of the Subſtance of the Lungs.

When the Faculty of Expiration is affected, the Conſequence will be that the Air not having a free Paſſage thro' the *Bronchus*, and there being but a little of it, the Evacuation of Fuliginous Matter will be imperfect, and the Diſcharge of the Spittle will be difficult and in ſmall quantity; ſo that theſe Humours, being retain'd in the Capillary Veſſels of the Windpipe, will cauſe the Defluxions and Obſtructions whereof we have made mention.

Another Cauſe is the ill quality of the Blood as it is groſs and circulates ſlowly; not only thro' the difficulty of Breathing, but alſo becauſe it is the product of a crude and indigeſted Chyle, as I have prov'd in ſpeaking of the Primitive Cauſes. This bad Blood will ſtagnate in the Capillary Veſſels of the

Pulmonick Veins and Arteries, upon finding the leaſt Diſpoſition thereunto in theſe Organs.

But one of the Principal Cauſes is the force of the Heart, which is ſo far from being leſſen'd in this Diſtemper that it ſeems to increaſe, when the Blood is ſent from the Heart to the Lungs with more Eaſe than 'tis return'd from the Lungs to the Heart, which is no ſmall Cauſe of the Diſorders that happen therein.

In fine, it will be eaſy for me to account for the *Thymus*, the Glands of the *Mediaſtinum*, the *Pancreas*, and the *Meſentery*'s being *Schirrhous*, becauſe I am convinced by Anatomy, that the one ſerve for a Paſſage to the *Lympha* and the Chyle, the others for the filtrating of the Diſſolvents, and in ſhort thoſe of the *Meſentry* for the Preparation and Paſſage of the *Lympha* and *Chyle*, and we have diſcover'd a groſſneſs both in the one and the other of theſe Liquids, ſufficient to ſtop them in the Glands where they co-agulate, harden, and ſwell.

Having found out both the Primitive and Secondary Cauſes, and explain'd all their Effects in the Diſeaſe in queſtion, I ſhall now mention ſome Objections that have been made againſt the Syſtem I have advanc'd.

1ſt. *Objection*, Children have been known to fall into the Rickets, without its being diſcover'd that either the Teeth, the Worms, bad Milk, or any ſuch like Cauſes have been the Occaſion of it.

2d. *Object.* There have been ſome who have never fall'n away, whoſe Arms and Legs were

were nevertheleſs crooked, which ſeems contrary to what I have laid down.

3d. *Object.* Others have only been Crooked and Lean on one ſide, which ought not to be if what I ſaid in the Cauſes of the Crookedneſs and Leanneſs were true.

4th. *Object.* If the Compreſſion of the Nerves of the Spine cauſes the Leanneſs in the ſoft Parts, it ought, one would think, to prevent the ſwelling of the Bones which are under the ſoft Parts that are fallen away.

5th. *Object.* According to what has been ſaid of the good plight of the Organs of the Senſes, the Liver, and the Spleen, and the Leanneſs of the other Parts, it can't be conceiv'd that this ſhould happen thro' the ſoftneſs of the Spine, which preſſes upon the Roots of the Nerves, ſince this Diſorder does not affect the Nerves of the Brain, although the Bones of the *Cranium* grow ſoft, as has been ſaid in ſpeaking of the largeneſs of the Head in ricketty Perſons, and the opening of the Sutures that unite the Bones of the *Cranium*.

In anſwer to the firſt Objection, I ſay, that if any Child has been ſeiz'd with the Rickets, without any Diſorders being perceiv'd in the five Things that I have laid down for Cauſes, one ought not to doubt but ſome of them have had a ſhare in it; ſince one may be miſtaken in examining a Nurſe's Milk, and in the Judgment one makes of the other Cauſes; ſeeing we are often attack'd with

common Diſtempers, whereof we our ſelves can but imperfectly gueſs at the ſecond Cauſes, and which we cannot certainly aſcribe to any Primitive one.

Anſwer to the ſecond Objection. If any Ricketty Child has been known who has not fall'n away, I may anſwer that 'tis poſſible the Softneſs of his Bones was not conſiderable, beſides that it may only ſeize upon certain Bones of the Extremities, without the Spine's being touch'd, and that thro' ſome particular diſpoſition, as I have juſt ſaid, or thro' ſome ill poſture the Nurſe may have uſed it to, or laſtly thro' the Cuſtom of the Child when it walks: For we ſee ſome lean to the Right ſide, ſome to the Left, and that walk tottering, and bend their Bodies alternatively, firſt on one ſide and then on the other, whence the Spine inclines different ways; ſometimes the Crookedneſs is on the Right ſide, ſometimes on the Left, and often it bends towards the Ribs, ſo as to aſſume the ſhape of a Wave.

It will by this Time be eaſy to conceive why the leanneſs is but on one Side. For inſtance, if the Spine bends to the Right, the Hollow Parts of the *Vertebræ* will be brought near each other, and the *Vertebræ* will, as it were, cruſh one another on that ſide that crooked; whilſt on the contrary the *Vertebræ* will be ſeparated, and their Hollows larger on the oppoſite ſide; whence the Nerves of the Spine are only compreſs'd on the crooked ſide, and the Animal Spirits not having their free Courſe, the Parts where they ought to be diſtributed will be lean and wither'd; whereas the oppoſite Parts

will

will be in good Caſe, becauſe their Nerves iſſue from the Spine on thoſe Sides where the *Vertebræ* are not depreſs'd by each other.

Anſwer to the fourth Objection. If the Bones don't wither like the ſoft Parts, that proceeds from the Animal Spirits contributing but little to their nouriſhment, ſeeing that this Spirit only helps to nouriſh the ſoft Parts by enduing them with an Elaſticity that makes an *Equilibrium* with the external Air, to the end that the Blood may penetrate them with eaſe, without being repell'd by the Spring and Weight of the exteriour Air; and the Bones however ſoft they be have yet ſolidity enough to oppoſe this Weight.

Anſwer to the fifth Objection. 'Tis ſufficient to give an Account why all the Nerves that come from the Cavities of the Spine are compreſs'd, whilſt there is no interruption of the Courſe of the Animal Spirits in the Nerves that iſſue from the Baſis of the *Cranium*. We can alledge Three Reaſons.

The firſt is that the Spine is (as it were) cruſh'd by the weight of the Head, but the Head having nothing to ſupport, is not ſo cruſh'd, wherefore the Nerves may paſs without ſuffering any Compreſſion.

The ſecond is, That the Nerves of the Spine run a greater length than thoſe of the Brain, excepting the 8th Pair and the *Intercoſtal*.

The third is, That the Nerves of the Spine come out Hornizontally, and thoſe of the Brain Perpendicularly, whence they are not compreſs'd like thoſe of the Spine.

All that we have ſaid ſeems ſufficient to give an Idea of the ſoftneſs of the Bones, of their Crookedneſs, and the other Accidents that proceed from it; we ſhall go on to the Prognoſtick and the Cure.

The Rickets are ſeldom cured when there is an *Hydrocephalus*, becauſe this Diſeaſe is Mortal of it ſelf, eſpecially when it is come to that Height as to ſeparate the Sutures.

They are but ſeldom cured whoſe conglobated Glands are hard and Schirrous, and particularly when thoſe of the *Meſentery* have this Defect, becauſe the Chyle muſt paſs thro' theſe Glands, which it can't eaſily do. And as Life is preſerv'd by the Chyle, which paſſes thro' theſe Glands to mix it ſelf with the Blood and renew it, if this Paſſage be once intercepted the Animal in the end muſt periſh.

They who have not bred their Teeth but ſeldom recover, both becauſe they ſink under the Pain of cutting them, and becauſe 'tis neceſſary they ſhou'd have them to chew, eſpecially if they are wean'd.

They whoſe Spine is not crookd are more eaſily cured; In ſhort, ſuch as eat with a good Appetite, and are brisk and lively, recover ſooner than others.

The Queſtion at preſent is, How to cure this Diſtemper, and it muſt be obſerv'd, that it is like others eaſier to be maſter'd in its Infancy, then when it has been of ſome ſtanding; that 'tis much eaſier to prevent it, then to hinder its Conſequences, and that when it is once at the height, Art has leſs ſhare in the Cure of it then Nature: And

what

what is moſt certain, is that one can't deſtroy any of its Effects, but by removing the Cauſe. Therefore to follow in the Cure, the ſame Order that I have obſerv'd hitherto, one muſt firſt have regard to the Primitive Cauſes, after which the ſecondary Cauſes and their Effects may be deſtroy'd.

As to the Primitive Cauſes, one wards againſt them as much as poſſible, by letting Children breath in a fine Air, by giving them nothing that will breed Worms, but eſpecially by providing them good Nurſes, and not making them leave a good Milk till they have moſt part of their Teeth, without which they fall into this Diſtemper as has been ſaid. And if for want of taking theſe precautions, the Child happens to be attack'd with this Diſtemper, here is in two words what muſt be done, either to cure it entirely, or palliate it.

Firſt one muſt preſcribe a Diet, which is different according as the Cauſes are different: If the Air be in fault, the Patient muſt change his abode; or if that be not poſſible the Air wherein he reſides muſt be corrected by the perfume of Plants impregnated with Sulphurous Particles, by the Calcination of Partridge's Wings, of Kids, of Hartſhorn, and other things that are full of Volatil Salts.

If the Teeth are hard to cut they muſt be help'd by rubbing the Gums often with the Blood of a Cock's-Comb, the Brains of a Hare, the Oyls of Sweet Almonds, Lillies, Palm, and other little Remedies, which Succeſs has made cuſtomary amongſt thoſe who have the Care of, and Nurſe Children: If

the Gums are too hard, they may be lanced to facilitate the cutting of the Teeth.

When there are Worms one muſt bleed to prevent an Inflamation, and give Clyſters of Milk, with a Decoction of Figs, Raiſins, and a little Sugar. On the contrary one muſt give them all the Bitters at the Mouth, as the Preparations of Wormwood, Succory, Rhubarb, *Quinquina*, *Opium*, and other Medicines that are proper to kill them.

The ſweet Clyſters attract the Worms, which being but meer Machines, muſt mechanically remove from the bitter Medicines that are taken at the Mouth, to draw near the ſweet one, which we have recommended to be given in Clyſters, which they can't do without approaching the Paſſage whereby one would expel them. But to diſpoſe them the more to paſs, one may give Catharticks with Succory Water, the Syrup of the ſame Plant and *Rhubarb*, or in its ſtead the *Syrupus Magiſtralis*, which produces two good Effects, for the Bitters kill or drive away the Worms, and beſides the working of the Purgatives, quickens the Periſtaltick Motion of the Guts, which inclines theſe Vermin to crawl downwards.

One muſt not forget Emeticks, and the Preparations of Mercury, which are good to kill the Worms and to diſcharge them, as well as the Verminous Matter. Infine, the Patient muſt be made obſerve a Regimen, by prohibiting the Uſe of all Food that is ſweet, milky, or apt to turn ſowr.

If the Nurſe who has begun to Suckle the Child, has not a good Milk, is Sick, has any Chagrin, is obliged to work much, or

fares

fares hardly, one muſt provide another from whom the Child may derive a good ſuſtenance, to the end the Chyle, the Blood, and the *Lympha* may be corrected, ſo as all the Parts may reſume their Plumpneſs, the Bones may grow and harden, the Teeth may cut, and the Child may have Strength ſufficient to bear up under the Pain they cauſe; ſo that if the Child falls into the Rickets immediately after being wean'd, and has been wean'd too ſoon, or before the cutting of its Teeth, it muſt be provided with a good Nurſe, whilſt one endeavours to deſtroy the ſecondary Cauſes and their Effects, after the following manner.

One muſt Purge, but it muſt be ſeldom, and with the moſt gentle Remedies, unleſs there be any Worms, becauſe 'tis not ſo neceſſary to evacuate as to correct the Blood and the *Lympha*, by the Decoctions of Aromatick Plants, and by Broaths, wherein one may put the *Polypodes*, the Powder of Vipers, inſtead of common Salt, the Volatil Salts of Hartſhorn, and *Cranium Humanum*: In a word all Volatil Salts are proper.

If the Child can't take theſe Remedies, or even if it takes them eaſily, one can't do better than to make the Nurſe uſe them alſo.

As for the Deformity of the Spine, the Breaſt, and other Limbs, they may be corrected, and even remov'd, if beſides the Remedies preſcrib'd, Care be taken to keep in the Spine by Bodice, and the Arms, Legs, and Thighs, by bandages of Leather, Linnen, and Steel, and by a Boot.

This

This is the ſum of what I thought proper to ſay, in order to give an Idea of the Rickets; if I have been more prolix upon the Cauſes, and the Explication of the Symptoms, than upon the Methods of Cure, 'tis becauſe I am convinced that Diſeaſes which are once well known, indicate of themſelves the Remedies that are proper for them.

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